

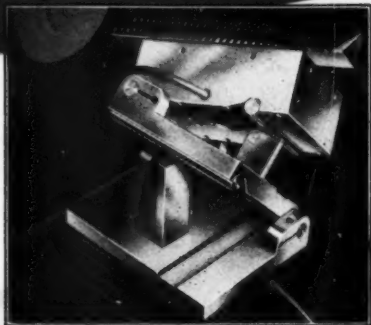
HITCHCOCK'S *Machine Tool* **BLUE BOOK**

FOUNDED

JANUARY 1940

1905

*How Would
You Like To
SAVE 55 MINUTES
OF ONE HOUR?*



BY THE MAGNA-SINE METHOD

..... to position the work at the exact angle and to hold it securely in place requires *only* the Magna-Sine and gage blocks. The entire set-up can be completed IN APPROXIMATELY FIVE MINUTES. After grinding, a positive check for accuracy can be made by simply checking the gage blocks used. With the Magna-Sine, every angular grinding job is accurate to the gage block limits.

If you do an average volume of angular grinding work, there's a place on your grinders for the time-saving, money-saving Magna-Sine. Let us send you full details.

Once it took an hour, but now the Colonial Broach Company completes this angular grinding set-up in five minutes! It's a typical example of savings that are effected by the use of the Magna-Sine . . . savings that have been realized consistently by Colonial Broach during the four years that they have been Magna-Sine users.



BY THE OLD METHOD

..... a set-up to grind this broach required a V-block, angle plate, two sine bars, two clamps, a strap and gage blocks. Such a set-up could not be made in much less than one hour. Initial accuracy could not be guaranteed, and there was no assurance that the various parts of the set-up would not slip or otherwise change position during grinding. It was essential that the finished job be checked carefully, often necessitating an additional set-up for this purpose.

The MAGNA-SINE

ROBBINS ENGINEERING

639 Mt. Elliott Ave. • Detroit, Mich.

MARVEL SAWS

... a complete line

A Complete System of Metal Sawing

When in Cleveland for the Machine Tool Show, be sure to visit the MARVEL exhibit in the Central Armory just across the street from the Cleveland Public Auditorium. See:

The full MARVEL Line of Hack Sawing Machines, Fully Automatic Production Saws, and Metal Cutting Band Sawing Machines, in operating demonstrations.

The non-breakable MARVEL High-Speed-Edge Hack Saw Blades and Hole Saws demonstrated under actual working conditions.

Bring your metal-cutting problems with you. A large corps of MARVEL metal-cutting engineers will be in constant attendance to discuss all metal-cutting problems and recommend proper methods and equipment for your work. As pioneers in the building of fully automatic production hack sawing machines; in the invention and development of the only genuine high speed steel hack saw blade that is positively non-breakable; in the design and building of "giant" hydraulic hack saws for the cutting of tough alloy steels in large billet sizes; and still the only manufacturer who offers full ball-bearing designs, you can assume complete confidence in our metal sawing recommendations.

MARVEL will have the most complete and the most comprehensive metal saw exhibition at Cleveland. Be sure to see it for the last word in modern metal saw developments.

Buy from your local distributor.



ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

CHICAGO

U. S. A.

...ES TIME
...HEAT"

Remote Control

● An exclusive Hobart feature, Remote Control, gives the operator 10 fine adjustments of welding heat at his finger tips, making it easy to get the exact welding heat for various positions without leaving his work. speeds up production, insures better quality welds, cuts labor costs . . . and helps make you more profit! Another Hobart advantage, Multi

Range Dual Control, gives the operator a choice of 1,000 welding combinations . . . making high-quality welds easy to produce.

30 DAYS TRIAL. We want to prove all we've said about Hobart Simplified Arc Welders to your own satisfaction. Write today for details of our liberal trial plan that lets you use a new Hobart Welder on your own work for 30 days . . . at our risk!

HOBART BROS. CO., Box TB-140, TROY, OHIO

"One of the World's Largest Builders of Arc Welders"

HOBART BROS. CO., Box TB-140, TROY, OHIO

Without obligation, send me full information about the new Hobart Simplified Arc Welder, particularly on the items checked below:

☐ Electric Drive ☐ Gas Drive ☐ "Build Your Own"

I'm interested in _____ Amp. capacity.

☐ Also information on ☐ 30 Days Trial ☐ Easy-to-Own Terms

☐ Reeling a new welder with purchase privilege

NAME _____

ADDRESS _____

X This valuable Hobart Catalog giving details of all Hobart Arc Welders on the Hobart





1890

HARDINGE

1940

GOLDEN
ANNIVERSARY

PRECISION SINCE 1890



FIFTY years of Precision . . . from the filing or polishing head, through watchmakers' precision tools and lathes to the modern, favorably known Hardinge High Speed Precision Cataract Machines.

Fifty years of Precision . . . from cone to enclosed head style bench lathes in various sizes and finally as the originators of the Enclosed Head Preloaded Ball Bearing Lathe.

Today it is the HARDINGE Enclosed Head Preloaded Ball Bearing Lathe with pedestal, combining experience gained in our fifty years of precision manufacturing.

Hardinge machine mountings have also kept pace with machine improvements and refinements. First came the bench, then the cabinet and now the new welded steel pedestal type, as illustrated, providing ample room for attachments and collets.

Watch future issues for our golden anniversary messages regarding the modern HARDINGE High Speed Precision Milling Machines, High Speed Precision Tool Room Screw Cutting Lathes and High Speed Precision Second Operation Machines. These messages will be of interest and value to you.

Ask for our latest bulletins presenting complete information on HARDINGE Precision Machines.

HARDINGE BROTHERS, INC.

ELMIRA, - - - - - N. Y.

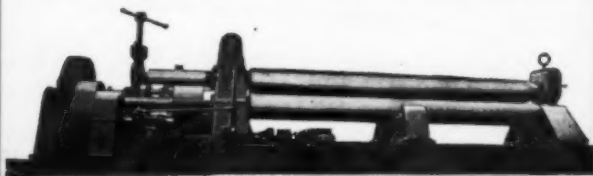
CHICAGO - NEW YORK - HARTFORD
DETROIT - CLEVELAND - PHILADELPHIA

Rock River Production Machines for working steel plates, bars and structural shapes

**Single end Vertical Punches and Shears
Double end Vertical Punches and Shears
Single end Horizontal Punches and Shears
Bending and Straightening Machines
Vertical and Horizontal Bulldozers
Hand Power Punches and Shears
Combination Punches and Shears
Alligator Shears
Splitting Shears
Bar and Billet Shearing Machines
Pyramid Plate Bending Rolls
Pinch Type Plate Bending Rolls
Culvert Pipe Equipment
Stake Riveters**

Descriptive bulletins sent upon request. Hannifin engineers will make specific recommendations to meet individual requirements.

**ROCK RIVER MACHINE DIVISION
HANNIFIN MANUFACTURING COMPANY
412 NORTH MAIN STREET • JANESVILLE, WISCONSIN**



Type S Plate Bending Roll, available in a full range of sizes.

MORE PRECISION WORK

On Rivett 104

With interchangeable spindles for internal and external grinding you are always ready for **MORE PRECISION WORK** whether it be in the toolroom or on small lot production. The ease of set-up, wide range of adjustment and high spindle speeds have built the fame of "104" as a "work-getter" throughout this country and abroad.

Write for Bulletin 104C

RIVETT LATHE & GRINDER INC.
Brighton, Boston, Mass.

Internal Spindle

External Spindle

RIVETT



MUCH STRENGTH IN LITTLE SPACE

When space limitations are severe but strength requirements rigid, designers are faced with a major problem. The use of Molybdenum steels has solved many such problems.

A manufacturer of industrial haulage trucks, for example, was up against that very situation. The drive shafts of this equipment must stand considerable abuse. Quick acceleration and sudden stops are the rule rather than the exception. And space is at a premium.

This manufacturer found in Nickel-Chrome-Molybdenum steel exactly the

qualities required — high strength, which permits relatively small section, plus an exceptional combination of toughness, ductility and fatigue strength. The machineability of this steel in the heat treated condition keeps fabrication costs down.

It will pay you to re-check your material specifications in the light of present knowledge of the qualities and characteristics of Molybdenum steels. Our helpful book, "Molybdenum in Steel", is sent free to interested production executives and engineers on request.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Molybdenum Company
500 Fifth Avenue New York City

MOLY

MORE *Hanna* *Cylinders*

ON THEIR WAY TO

PUSH PULL RAISE LOWER



CAN YOU USE ONE?



Available in all sizes and several models. Low first cost and ease of application encourages the use of Hanna Cylinders for all manner of operations.

HANNA

Engineering Works
1763 Elston Avenue
CHICAGO ILLINOIS

Beatty

TOGGLE DRIVEN BEAM PUNCHES

FOR PUNCHING EXTRA LARGE STRUCTURAL SHAPES AND MANUFACTURED PARTS

Giving you the many advantages of toggle drive—delivering maximum punching force at the point in the stroke where it is most required—imposing a more uniform torque on the motor—permitting a smaller flywheel—reducing power consumption, cutting maintenance costs and saving floor space—as contrasted with units with drives of the eccentric type.

See how these BEATTY specifications compare with your requirements:

	No. 13	No. 14	No. 15
Face of slide, r to l, St'd.	12½"	12½"	13"
" " " Maximum	24	24	34
" " " front to back	48	60	60
Die space	42	48½"	48½"
Stroke	2	2½"	3"
Throat	25	28½"	34
Face of table, front to back	46	60	64
" " " r to l, St'd.	22	22	28
" " " Maximum	30	34	38
Capacity	200T	300T	400T
Shipping weight, lbs.	42,000	57,000	76,000
Motor required, H.p.	7½	10	15
Spacing table to suit requirements			

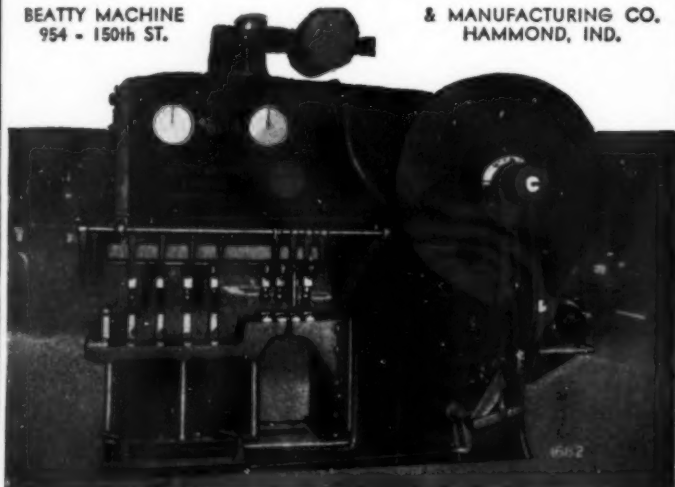
Punching capacity

2 holes 1½" thru 1" 4 holes 1½" thru ¾" 4 holes 1½" thru 1½"

Send for Folder 1500-A giving full information.

BEATTY MACHINE
954 - 150th ST.

& MANUFACTURING CO.
HAMMOND, IND.



SKILSAW TOOLS
are used to improve workmanship, reduce costs
in building the famous precision machines at
EX-CELL-O CORPORATION

• Drilling holes for same-size in the side of an Ex-Cell-O Precision Machine—using a SKILSAW 5/16 in. capacity Drill.

• Finishing a side and on the table of an Ex-Cell-O Precision Boring Machine—using SKILSAW Model "B" Belt Sander.

• Counterboring a hole in an Ex-Cell-O Precision Thread Grinder base—using a SKILSAW 3/4 in. capacity Drill.

Every one of these operations—so slow and costly when done by hand—is made fast and profitable by the use of SKILSAW TOOLS in the plant of Ex-Cell-O Corporation at Detroit, well-known as one of America's finest manufacturers of precision machinery.

In every industry, SKILSAW TOOLS are used to

step-up production, reduce costs and improve workmanship. They are preferred because they're designed and built to the most exacting precision standards . . . to give long years of dependable, trouble-free operation. Ask for a FREE demonstration on your own work. Sold by leading mill supply distributors.

SKILSAW

SEE YOUR
DISTRIBUTOR
He will gladly
demonstrate
how SKILSAW
TOOLS will
save you money

SKILSAW, INC.,

5035 Elston Avenue, Chicago, Ill.

20 East 22nd St., New York—142 Main St., Buffalo—32 Brookline Ave., Boston—15 E. 21 St., Philadelphia—2124 Main St., Dallas—618 Union Street, New Orleans—1233 South Flower St., Los Angeles—2865 Webster Street, Oakland—29 North Ave., N.W., Atlanta—1119 Olive Way, Seattle
Canadian Branch: 85 Delaware Ave., Toronto.

Motor-Avey

Drilling AND Tapping Machines

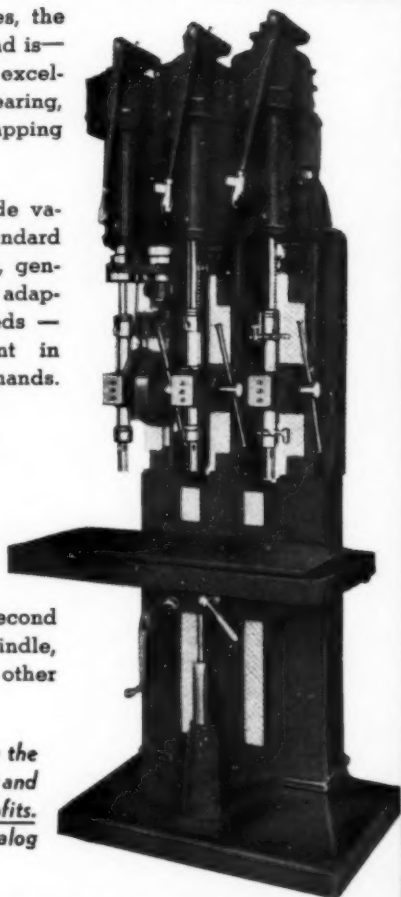
For more than three decades, the name "AVEY" has been—and is—regarded as the standard of excellence in the making of ball bearing, sensitive drilling and tapping equipment.

Avey products include a wide variety of types and sizes in standard single and multiple spindle, general purpose machines—also adaptations to specialized needs—meeting every requirement in today's high production demands.

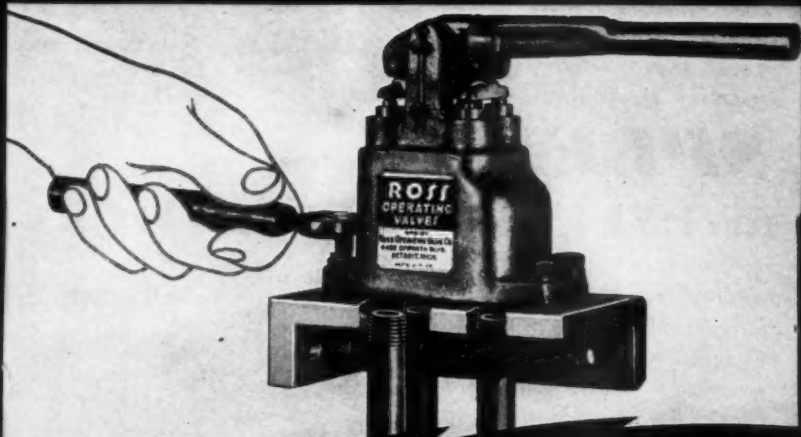
TYPE MA-6 Six Speeds

The unit shown is the six-speed No. 2 Combination Machine Type MA-6. First spindle is Avey-matic; second spindle, hand feed; third spindle, tapping. Can be supplied in other combinations as required.

Let AVEY Equipment show you the way to new economies in drilling and tapping—new production profits. Send TODAY for AVEY Catalog No. 39.



The AVEY DRILLING MACHINE CO., Cincinnati, O.



JUST 3 MINUTES

*that's all the time it took
me to change valves. . . .*

★
A SIZE AND TYPE
FOR EVERY OPERATION



Ross Valves permit speedy removal—only four bolts to turn and the job is done. All piping is installed permanently to bracket and need never be disturbed. Shut-down periods are thereby shortened and valuable time saved. It's another feature recommended and originated by Ross.

Send for Catalog

ROSS Operating VALVE CO.
6480 Epworth Boulevard
DETROIT, MICHIGAN

MEET MODERN COMPETITION

comes now . . .

SPEED *of control* **in HYDRAULIC OPERATIONS**

Speed of reaction without sacrificing efficiency is now being had by pneumatically controlling hydraulic power valves. There is an important saving in reaction time of pneumatic controls over the comparatively slower hydraulic reaction in identical circuits.

T-J Pneumatic Remote Controls provide full advantage of this saving also in that their variety of unit types permit their application to your requirements to be of standardized equipment.

Bulletin number RC-4 reports on the high points of these systems in this application type as well as in many others in which they are being successfully and increasingly used. Your copy will be sent promptly upon receipt of your request.



T-J Controls are shown here on a T-J Hydraulic Rivitor. Developed for riveting aircraft fuselage and wing sections, the operator's station is necessarily some distance from the power valve. T-J Pneumatic Controls provide the desired snappy reaction to the power valve.

this is a **TOMKINS-JOHNSON** *product*

Factory at 605 N. Mechanic St.,

Jackson, Michigan

Agents in principal cities. T-J Products also include Air and Hydraulic Cylinders . . . Rotating Chucks and Cylinders . . . Rivitors . . . Clinchors . . . Special Equipment . . . Brownie Coolant Pumps . . . T-J Die Sinking Milling Cutters.

MEET MODERN COMPETITION

With Chicago Steel Brake
Production Performance

36 Years' Experience..



**BOX
AND PAN
BRAKE—**

Forms boxes or pans from one piece of metal. A straight brake as well as a box brake. Ideal for experimental shops.



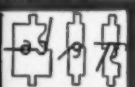
HAND BRAKE—

Improved to meet modern needs. Efficient and dependable — sturdy and durable.



POWER BENDING BRAKE—

Indispensable wherever a volume of heavy plate work is done—forms a great variety of bends and shapes without dies.



**FORMING
PRESS DIES**

We manufacture any type of die required for forming process. Our die department will quote on any type to meet your needs. Submit blue print or sample of work.

building STEEL CONSTRUCTED sheet metal working machines are behind each CHICAGO BRAKE. They're built to give years of service.

ALL CHICAGO BRAKES are built of rolled steel welded sections which insure great strength, accuracy and long life. They are the most modern tools in design and workmanship to fit today's need for fast production sheet metal working machinery.

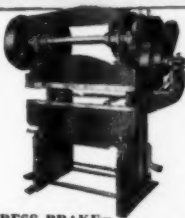
We Are The World's Largest Manufacturers Of Hand Bending, Power Bending And Power Press Brakes.

Aside from the CHICAGO line, we have built many special machines for intricate bending operations. Take advantage of our many years' experience by sending us any difficult bending problem you have.

DREIS & KRUMP MFG. CO.

7440 LOOMIS BLVD.,

CHICAGO, ILL.



SMALL PRESS BRAKE—

Compact, powerful money-saving production unit. Replaces cumbersome costly machines that are expensive to operate. Uses same dies as larger machines.



LARGE PRESS BRAKE—

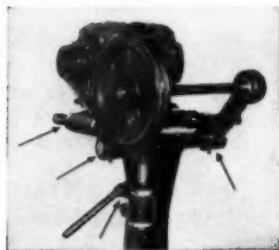
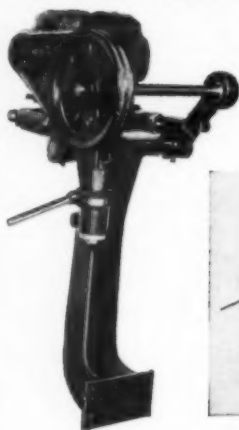
The only press brake which turns out perfect work without shims and crowned dies. Patented non-deflecting bed equalizes pressure over the full bending length and overcomes major fault in solid bed press brakes.

OVER 40,000

"CHICAGO" BRAKES in use by leading concerns—the world over

MACHINE TOOL DRIVES

**ANY
MACHINE
ANY TYPE
ANY SIZE**



Buy with Confidence and the Thought of Tomorrow

Berkeley Machine Tool Drives have those exclusive features not disclosed in their price, but remembered during the years of economical service they give.

Welded steel supporting brackets with aligning screws.

Rigidity of countershaft support that permits no distortion or mis-alignment.

Simple, quick adjustments for all belts which will insure long uninterrupted periods of service.

A competent organization is ready to serve you.

The BERKELEY ENGINEERING Co.

1381 E. 17 th St.,
CLEVELAND, OHIO

CORRY,
PENNSYLVANIA

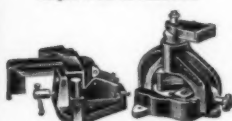
WHITNEY TOOLS

**MADE BY SPECIALISTS TO MEET EVERY
NEED OF PRACTICAL SHEET METAL MEN**



**No. 4 Angle
Iron Shear**

Capacity 2"x2"x¼"
angle iron or smaller.



**Angle Mitre
Notcher and Angle
Iron Bender**

Capacity 2"x2"x¼" angle iron
or smaller. A pair of tools
that every shop ought to have.
They are Nos. 50 and 51 in
our catalog.



Aircraft Rivet Squeezer

Capacity ¼ inch aluminum rivet. Spindle travel
13/16 inch. Made in 5 sizes, with throat depths
from 1¼ to 6 inches.

Send for the complete Whitney catalog.



No. 10 Ball Bearing Punch

Capacity ⅞ inch through ¼ inch iron. Depth of
throat 1½ inch. Height of throat ⅞ inch. Fur-
nished with one punch in any size from ⅞ to ½
by 1/32.

Whitney manufactures
more than 80 types of
Shears, Punches and
other tool equipment for
metal working — de-
pendable items perfect-
ed through long expe-
rience and close contact
with the trade — tools
that have "always made
good."

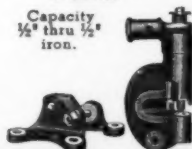


**Imperial
Roller Bearing
Punches**

—offered in 3 sizes—will work
inside 90 degrees. Quick
changing for punches and
dies—no cams to wear—strip-
ping action is positive.

**No. 20
Ball Bearing
Punch**

Capacity
½" thru ½"
iron.



WHITNEY METAL TOOL COMPANY
115 FORBES ST., ROCKFORD, ILLINOIS



\$291.⁰⁰

No. 1545 — Complete
with production type
table and stand, motor
pulleys and belts—but
without motors.

DELTA
MANUFACTURING CO.
(INDUSTRIAL DIVISION)
603 E. VIENNA AVENUE
MILWAUKEE, WIS.

*"These drill presses
pulled me
out of a jam!"*



"Because they not only enabled me to speed up production with a small new tool investment—but I was given quick delivery on them. Yes, I got them—without the old man raising the roof on their cost."

That is what scores of production superintendents are telling us about Delta Drill Presses. They come with single or multiple spindle, floor or bench types, 11", 14" and 17" models. They give you durable precision machines at a fraction of the cost of the old type heavy machines. They are flexible—adaptable to special jobs and quick changes. They can be used for special set ups at great savings. The two-spindle 17" model here illustrated gives an

Outstanding Drill Press Value

Drilling capacity: $\frac{3}{4}$ " in cast iron. Table $29\frac{1}{2}$ "x $41\frac{1}{2}$ ", surface $23\frac{1}{2}$ "x 36 "; $48\frac{1}{2}$ " high. Center to center between spindles 18". Column diameter $3\frac{1}{2}$ ". Maximum distance chuck to table, 26". Table has $1\frac{1}{2}$ " oil trough, drilled and tapped at rear for $\frac{1}{2}$ " oil drain pipe. Quill has 5" stroke. Built-in depth stop gauge. Depth gauge on spring housing. Sealed for life ball bearings. Interchangeable spindles and heads. Shipping weight 860 lbs.

Send for Delta Catalog

Mail coupon for latest Delta Industrial Power Tool Catalog. It contains specifications and prices of complete line of Delta Drill Presses plus details on individual parts from which you can make your own low cost assemblies.



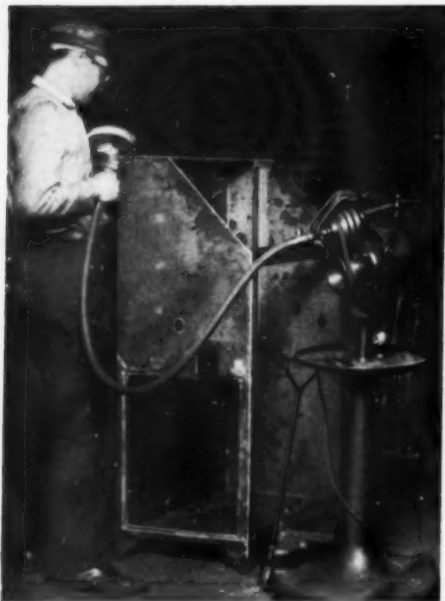
Delta Mfg. Co., (Industrial Division)
603 E. Vienna Ave., Milwaukee, Wis.

Gentlemen: Please send me your latest Delta Catalog which contains specifications and prices of your complete line of Drill Presses.

Name

Address

City..... State.....



**This man
cleans welds**



But they

**This man builds
machine tools**



**This man finishes
forging dies . .**



**This man finishes
parts at the bench . .**

all use KELLERFLEX!

THERE is no limit to the number of places Kellerflex equipment can be applied successfully. Shop men welcome the chance to substitute this compact machine for hand drudgery. It is excellent economy, because it saves skilled hands for the work that machines cannot do.

Pratt & Whitney is Headquarters for the finest of flexible shaft equipment. Pratt & Whitney precision goes into every part. This quality

insures smooth, accurate operation and long life, even under the most difficult working conditions.

There are many styles and sizes of Kellerflex machines. Each has a complete line of accessories and attachments which make it applicable to almost any finishing job. Let our Kellerflex experts show you the many ways these handy machines can save time and pay dividends. Write for complete information.

PRATT & WHITNEY

Division Niles-Bement-Pond Co.

Hartford, Connecticut

Kellerflex Sales Department

KRW HYDRAULIC ARBOR PRESSES

HAVE SPEED AND POWER FOR INDUSTRIAL USE



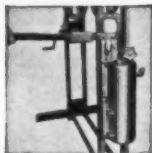
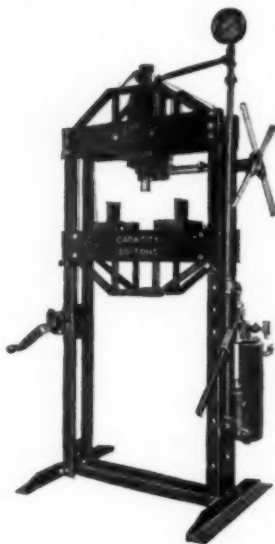
Rack teeth cut directly into ram—no separate rack bar.



Heavily constructed enclosed drum and ratchet raises and lowers bed.



Extensible cross-arms for greater leverage have locating grooves for extended and central positions.



Oil reservoir tank has convenient filling plug and shut-off valves.



V blocks furnished have machined shoulders for accurate alignment on bed.



Machined shoulders align V blocks when in inverted position and prevent slippage.

Built with the speed and strength necessary for industrial use, KRW Presses perform such operations as broaching, assembling, straightening, bending, offsetting, squeezing, pressing, and flattening. Small blanking operations can be performed when the blanking dies are built into a die set provided with guide pins.

Strictly a one-man press, special KRW features minimize operator fatigue. Trussed design of bed and crown members results in extreme rigidity and accuracy.

Write for new bulletin describing this cost-cutting equipment.

PRICES F. O. B. FACTORY, ARCADE, N. Y.

No. 37—35 ton Hydraulic and Sensitive Arbor Press	\$150.00
No. 37E—50 ton Hydraulic and Sensitive Arbor Press	180.00
No. 37F—75 ton Hydraulic and Sensitive Arbor Press	300.00
Gauge and fittings, \$20.00 extra on all presses.	

K. R. WILSON

10-16 Lock Street, Buffalo,

Export Department

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West Coast Branch

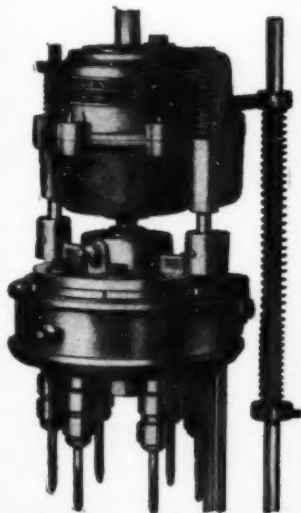
722 Mateo St., Los Angeles

Ettco - Emrick

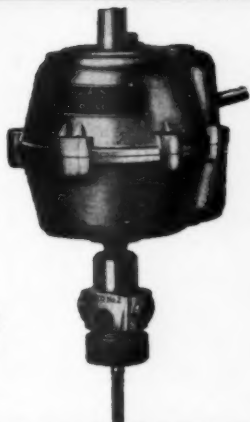
TAPPING ATTACHMENTS

THE EXACTING REQUIREMENTS OF TAPPING IS UP TO THE FRICTION CLUTCH

ETTCO PIONEERED SENSITIVE TAPPING WITH A LEATHER LINED FRICTION CLUTCH. AS YET WE HAVE FOUND NO SUBSTITUTE TO EQUAL ITS SMOOTH, SENSITIVE ACTION. IT SAVES TAPS, LASTS LONGER AND INSURES ACCURATE HOLES.



SEVEN SIZES
FROM THE
FINEST TO
1" TAPS



MULTIPLE SPINDLE TAPPING HEADS DRILL HEADS

"A STANDARDIZED SYSTEM"

ETTCO HEADS ARE A MANUFACTURED PRODUCT ASSEMBLED TO FIT YOUR NEEDS.

SERVICE IS FROM STOCK PARTS, THE COST IS LOW AND YOUR JOB IS FROM 100 TO 500% FASTER.

LET US HAVE A PRINT OR SAMPLES OF YOUR SMALL PARTS—WE WILL BE PLEASED TO SEND A STANDARDIZED QUOTATION.

ETTCO TOOL CO.

594 JOHNSON AVE.,
CHICAGO

BROOKLYN, N. Y.
DETROIT

A
**Glimpse
INTO
OUR
SERVICE**



COAST

from

These pictures show very vividly the four different services at your command. These services include:—

TOOL SALVAGE—

Recutting drills, reamers, end mills, cutters and files.

**HARD CHROME
PLATING—**

Rebuilding pneumatic tools and parts to standard size.

**HARD CHROME
PLATING—**

Machine parts and dies plated for longer service.

**PNEUMATIC
TOOLS—**

Master chipping hammers, parts and accessories.

MASTER TOOL CO., INC.
Cleveland, Ohio

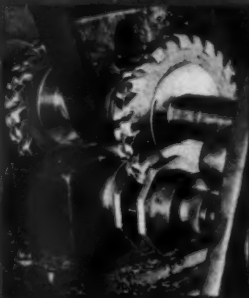
**THE MASTER
CHROME SERVICE, INC.**
Cleveland, Ohio

Coast

From the rocky coast of Maine, to the sunny shores of California, this unique service is at your fingertips. In 30 of the largest cities, representatives are located who will take care of your orders. Send for our catalogs giving detailed description of these distinct services and listing the representative nearest you. Call a representative in and have him give you an estimate.

**THE ONLY COMPLETE
TOOL SALVAGE SERVICE**

**EASTERN CUTTER
SALVAGE CORP.**
Newark, New Jersey



MAX-WELL-MADE PRECISION TOOLS



MASTUR
Precision
Boring
HEAD
3
Sizes

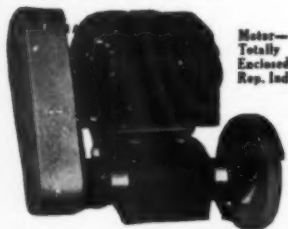
Direct reading in
thousandths.
Veneer reading
two tenths.
Boring Cap. 7° to 15°.



E-Z SET
Boring Tool
3
Sizes

Adjustment
actuated by worm.
Can be used as Radius Tool.

TYPE HE ½ H. P.



Motor—
Totally
Enclosed
Rep. Ind.

Internal or External. Internal Spindles up to 24" long.

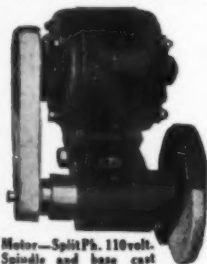
TYPE E ½ H. P.



Motor—
Vented
Rep. Ind.

Spindle and Base Cast Solid.

TYPE N ¼ and C ⅓ H. P.



Motor—Split Ph. 110-volt.
Spindle and base cast
solid. A general Utility
Grinder.

TYPE U—1—2—3—5 H. P.



Motor—Totally
enclosed fan
cooled 3 Ph.
220/440 Volt.

Internal or
External.
Equally as effi-
cient on fine pre-
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tion work. Internal Spindles up to 48" long.

Send for individual descriptive circular.

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F. A. MAXWELL COMPANY
300 S. BROADWAY, BEDFORD, OHIO

AIRCRAFT Plants Make 3-Point Landings on Production Schedules !



Fast moving on the production line as their finished ships are in the air—American Airplane Manufacturers are meeting almost unbelievable schedules.

In a large percentage of these aggressively-managed factories, Buffalo Bending Rolls are helping to build better planes—faster. Used to bend any shape into arcs, circles, or spirals—easily operated by unskilled labor—fast, dependable, accurate—Buffalo Bending Rolls are the real answer to many a production “bottle-neck.” If you’re interested, write for Bulletin No. 352, and tell us what you bend.

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The New PROCUNIER

UNIVERSAL Tapping Machines

If you're seeking maximum production tapping, with accuracy, flexibility, dependability and economy, you'll be interested in the new PROCUNIER Universal.

It offers remarkable speed and precision tapping on production jobs, plus three revolutionary features:

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2—One machine handles tap sizes from No. 2 to $\frac{1}{2}$ " through two interchangeable tapping heads.

3—Extra long spiral compensating springs conveniently located, with wide range hand screw adjustments, maintain pre-set tap feeding and reversing pressures independent of operator.

Whether for highly specialized production, or work involving wide variations, the PROCUNIER Universal offers outstanding advantages.

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PROCUNIER SAFETY CHUCK CO.
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Lower PRODUCTION COSTS!



By Use of DURO PRECISION BALL BEARING DRILL PRESSES

A Chicago Manufacturer reports a surprising reduction in his production costs on these drilling and tapping operations since installation of this battery of four Duro Precision Ball Bearing Drill Presses. The operator moves quickly from one spindle to the next for continuous production. Just one set up where two were formerly required. And what is equally important, this new equipment costs less than $\frac{1}{2}$ as much as his older and less efficient equipment.

Let us show you how you too can reduce your costs by installing modern precision tools.

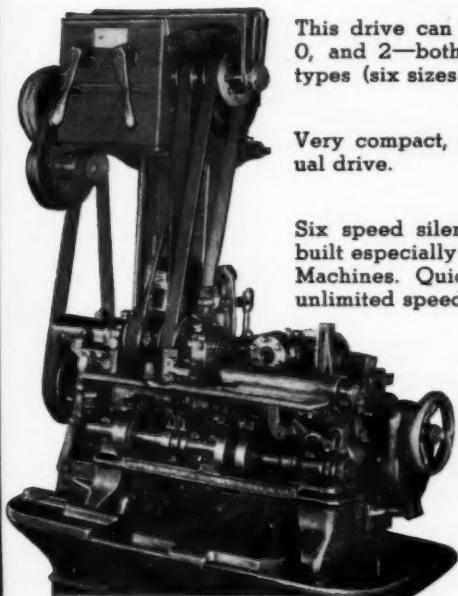
Manufactured By

The Makers of America's Finest and Most Complete Line of Power Driven Machinery.

DURO METAL PRODUCTS COMPANY
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This drive can be furnished for sizes 00, 0, and 2—both standard and high-speed types (six sizes in all).

Very compact, quiet and efficient individual drive.

Six speed silent sliding gear transmission built especially for Brown & Sharpe Screw Machines. Quick change of pulleys gives unlimited speed range.

Anti-friction bearings throughout. All steel, heat-treated gears running in oil.

Can be installed without drilling in one hour.

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USERS: See your dealer or write for full facts!

Patents Pending

Turner Uni-Drives built for lathes, shapers, radial drills, turret lathes, vertical mills, etc.

THE TURNER UNI-DRIVE COMPANY

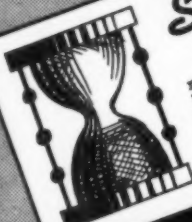
1638 Central St., Kansas City, Mo.



SAVE ALL WAYS

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Save Time



The R & L Turning Tool is capable of doing many different jobs at a single setting, saving hours of setting-up work. And the multiple operation features save in operation time by doing two or three jobs simultaneously . . . drilling, turning and burnishing in one operation, for example.

Save Money

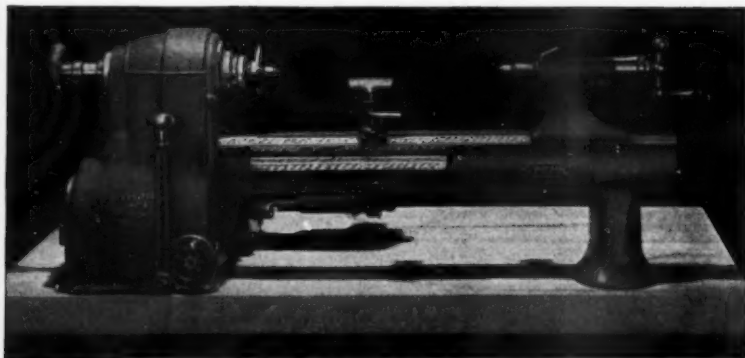


In first cost alone, you save as much as \$200, as that is what separate tools would cost you to do right and left hand jobs of turning, pointing, centering, etc. Then there are the savings through speeding up operations . . . and important savings in maintenance because R & L tools are simple and sturdy, with a minimum number of wearing parts.

Write for full details.

R and L Tools

NICETOWN, PHILADELPHIA, PA.



DON'T BUY UNTIL YOU HAVE SEEN THE

NEW--"Stark"

Integral Drive
Precision Bench Lathe
PATENTED

ITS BUILT-IN DRIVE LEADS ALL COMPETITORS

The first tool of its class with built-in motor and speed changing mechanism, entirely eliminating mill wrighting.

Nothing under the bench . . . nothing overhead. Special bench or even bolting to bench, unnecessary.

The $\frac{1}{2}$ h. p. geared ball bearing motor drives through a disc clutch and vertical V belt sheaves, and through V belts to the headstock, giving any speed at the turn of a wheel (located in front of lathe) from 156 to 2200 r.p.m. in Standard Model, and 260 to 3500 r.p.m. in High Speed Model. Speeds registered on a neat indicator.

Simply moving control lever to right engages the clutch, vertical position

releases, moving to the left instantly brakes the moving spindle.

Time-tried Stark double taper bearings in Standard Model. Best precision preloaded anti-friction bearings in High Speed Model.

Both $\frac{3}{4}$ and 1 inch collet capacity furnished in either model . . . 9 inch swing . . . 40 inch length of bed . . . Weighs 310 pounds . . . Takes regular Stark Attachments, Collets and Chucks.

Stark accuracy and stamina are traditional . . . incorporated in this streamlined new lathe.

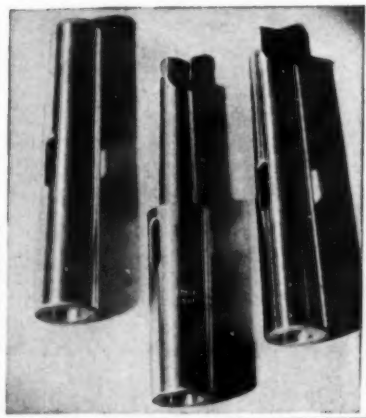
Priced at only slightly more than other precision lathes with SEPARATE complicated drives.

STARK TOOL CO. WALTHAM, MASS, U.S.A.

ESTABLISHED 1862 • ORIGINATORS OF THE AMERICAN BENCH LATHE

SCIENTIFICALLY
HARDENED

•



PRECISION
GROUND

•

AMERICAN INDUSTRIES

WERE QUICK TO RESPOND TO THE
ANNOUNCEMENT OF MIDWEST'S NEW
HARDENED SLEEVES and HERE'S WHY—

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3. Tool costs are definitely lower, because a Midwest hardened sleeve has a greatly increased length of life compared to the ordinary soft sleeve.
4. Immediate shipments are made from stock at minimum prices.

• *Bulletin 16-7*

sent at your request, enables you to have complete information at your finger tips.

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2331 W. Jefferson, Detroit - - - - Offices in all principal cities.



CENTRIFUGAL COOLANT PUMPS AND BY-PASS OIL RELIEF VALVES

Compact and efficient new coolant pumps designed to handle coolant containing chips and abrasive material. There is no packing to wear. A short motor shaft extension drives the free floating impeller. A special patented seal seats against the pump housing, leaving motor shaft free from wear. Coolant can be throttled down or shut off while motor is running without injury to pump or motor. The Master motors are of the ball bearing splash-proof type.

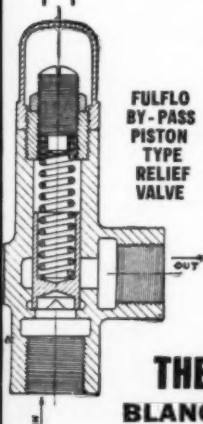


Symbol
FVM
Vertical
Type



Symbol FHM
Horizontal Type

Pump discharge is 1". Horizontal unit is tapped for 1 1/4" suction pipe. Mounting flange permits bolting vertical pump to side of tank or machine. At 1725 r.p.m., with 1" pipe and a 5' head these pumps will deliver 30 gallons per minute. With a 1" nipple and 1 1/4" hose on discharge they will deliver 45 gallons per minute at a 5' head.



FULFLO
BY-PASS
PISTON
TYPE
RELIEF
VALVE

FULFLO BY-PASS PISTON TYPE OIL RELIEF VALVES are available in cast iron or bronze, with pipe sizes from 1/4" to 1 1/2", for pressures up to 350 lbs. May be equipped with brass, hardened steel or stainless steel pistons.

*May we send you complete information
on the FULFLO Line?*

THE FULFLO SPECIALTIES CO., INC.
BLANCHESTER **OHIO**

STEADY *Flame* STEADY *Heat* WITHOUT *Pumping*



NATIONAL PUMPLESS SAFETY TORCH

Feature for feature, dollar for dollar, National Pumpless Safety Torches are the greatest torch value on the market. Elimination of the old fashioned pump alone makes them a great value—But their many other exclusive features have proved them to be unequalled in Safety, Economy and Efficiency.

Do not confuse National Pumpless Torches with wick-fed torches. National design and construction provides the correct operating pressure within the tank with more than ample safety without the necessity of continuous pumping of oxygen into the tank—tests have proven that they deliver 2400° Fahrenheit and a flame that is fully adjustable for any purpose for which a blow torch is used. They burn from full to empty without any attention whatsoever.

Free
**COMPLETE
DETAILS**

Just drop us a post card today and ask for our latest circular giving complete information about their construction and operation.



NATIONAL SAFETY DEVICE CO.
836 W. HUBBARD ST., DEPT. BB-12
CHICAGO, ILLINOIS

CANEDY - OTTO

No. 18 ROYAL

Floor and Bench Model Drills



Featuring:

6 Speeds, 240 to 2185 with 1200
r. p. m. motor—345 to 3250
with 1800 r. p. m. motor.
18" swing $5\frac{1}{4}$ " spindle travel.
Sand cast, machined V-belt pul-
leys.
Alloy steel 6-spined spindle,
ground and polished.
High grade Lubri-seal ball bear-
ings throughout.
Spindle cone pulley rotates be-
tween annular ball bearings.
Bench base working surface 16"x
16", over all $21\frac{1}{4}$ "x28".

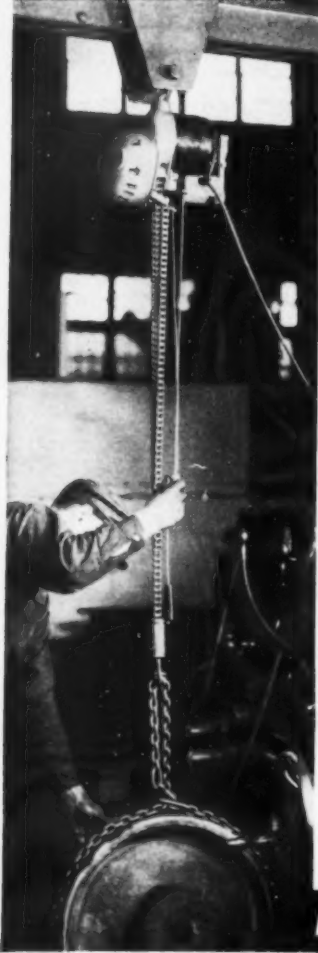


These are sturdy, dependable drills, capable of accurate drilling on rigid day-after-day production schedules. Supporting columns are rugged. The Lubri-sealed bearings assure easy running and long life. Working surface is handy—and the three spoke feed is fast and easy to operate. Capacity up to $\frac{3}{4}$ " with $\frac{1}{2}$ h. p. motor, or up to one inch with $\frac{3}{4}$ h. p. 1200 r. p. m. motor.

CANEDY-OTTO MANUFACTURING CO.
CHICAGO HEIGHTS, ILLINOIS

Portable Electric **'BUDGIT'** HOISTS

SAME PRODUCTION — WITHOUT OVERTIME



Here is one way to get 44 hours production in 42 hours *without* overtime. Use "Budgit" Hoists to do the lifting that you now do manually! . . . They salvage 20% to 40% *and more* of the "waiting" time of machines and men that is lost when lifting is done by hand or with chain hoists. "Budgit" Hoists are available in 250, 500, 1000, and 2000 pounds lifting capacity with speeds to suit today's tempo. . . . They quickly earn their low cost *over and over again* out of savings. Prices start at \$119. . . . You can put them to work immediately! There is nothing else to buy! . . . You simply hang up, plug into the nearest lamp socket or power circuit receptacle and Use!

- Send for Free Catalog and "Time Savings Calculator" that assists you to determine savings.

SHAW-BOX CRANE & HOIST DIV.
MANNING, MAXWELL & MOORE, INC.

435 Broadway Muskegon, Michigan

Makers of all types and sizes of cranes and electric hoists for more than half a century.

HANG UP, PLUG IN, USE!



Why hold up production by putting skilled machinists on Tool Grinders

Sellers 20W Tool Grinder

OF course, machinists like to grind their own tools . . . they also have their own ideas of how tools should be shaped and what clearance they should have. All of them cannot be right—a machinist at best seldom grinds two tools alike.

Why pay skilled machinists to grind tools? An expensive machine stands idle . . . production is held up! Have your tool room attendant do this job. With a Sellers Tool Grinder, he can grind tools better than the best machinist can by hand . . . and in less time. Less tool steel will be wasted and the tools will last longer and cut better. And your machinist can be kept on the work you are paying him to do.

If you are looking for a way to save money and keep production at peak, we know you will want more information about Sellers Tool Grinders.



WILLIAM SELLERS & CO., Inc.
616 HAMILTON ST. PHILADELPHIA, PA.



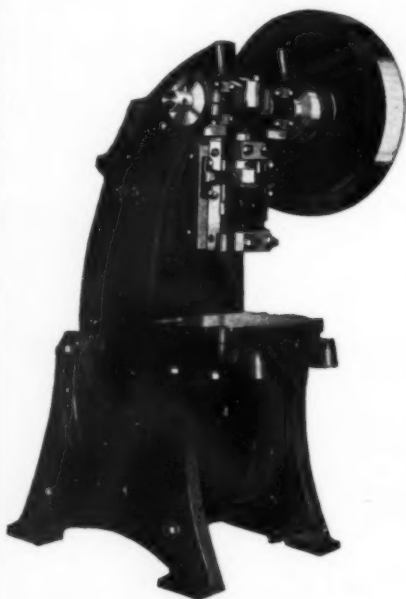
Sellers

PRESSES DESIGNED AND BUILT BY

MARSHALLTOWN

GIVE BETTER PRODUCTION AND LONGER LIFE

★ GET THE MOST FOR YOUR MONEY ★



No. 5 FLYWHEEL TYPE



The Marshalltown Line includes inclinable presses from 5 ton to 70 ton capacity.



Features of design include more die space, chrome nickel cranks, wrist pin connections and many other proven elements of correct design.



Literature fully describing this sturdy, dependable line of presses will be sent on request. It will pay you to investigate.

MARSHALLTOWN MFG. CO.

900 East Nevada Street,

Marshalltown, Iowa



SPECIFICATIONS:

Price listed includes 3-Speed Gear Box, Support Brackets and Motor Rails.

4-Speed Units—\$10.00 additional.

Power take-off on either end of unit optional.

Gears are heat treated and run in oil.

Pulley Shafts— $1\frac{1}{4}$ " dia., fitted with ball bearings and special oil seals.

Belt adjustments provided.

Designed to drive machines that require from 1-HP to 5 HP motors.

Brackets for most types of tool-room and production machines in stock.

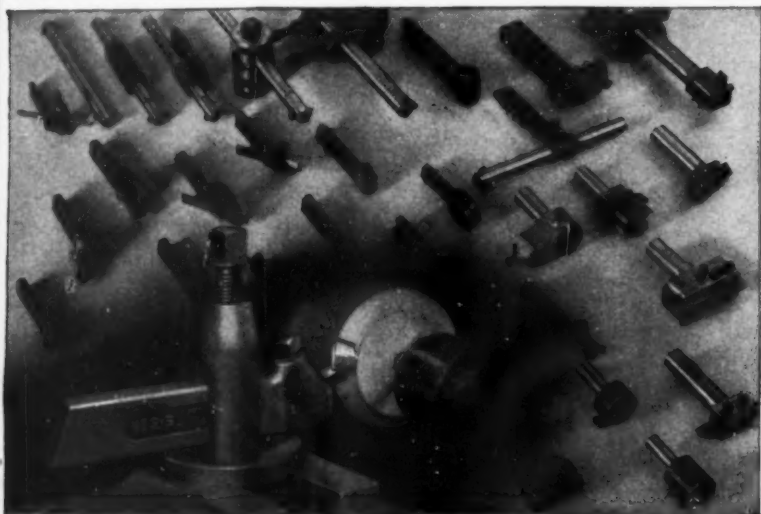
PRICE

\$87.50

DRIVE-ALL MANUFACTURING CO.

3401 CONNER AVE. :—: DETROIT, MICHIGAN

ARMSTRONG



IMPROVE QUALITY, INCREASE OUTPUT and LOWER COSTS WITH ARMSTRONG TOOL HOLDERS

You will do better work with the right ARMSTRONG TOOL HOLDERS on any lathe, planer or shaper, for it will give you maximum strength and rigidity, maximum clearance and visibility, will be correct in design, in cutting angle and approach, and will provide a cutting point to the finest cutting steel. You will get smoother, more accurate threads, will be able to cut-off even the largest and toughest pieces with ease, will avoid loss through tool failures, breakage and mishap, can plane tops, both sides on a planer with same tool (illustrated)—can set the cutter in any of 10 positions or reverse the entire tool to make it a "goose necked" tool. Will produce more work at lower tool cost.

With a complement of ARMSTRONG TOOL HOLDERS (the correct Tool Holders for each operation) you can increase output at will, for each has the strength for speeds and feeds far beyond "normal" shop practices. You will save "getting ready" time too, will be permanently tooled-up and waiting machine hours will be turned into producing hours and lost time into profits.

Write today for the new ARMSTRONG C-39 Catalog. Check up your present tool set-up. You can always pick up ARMSTRONG TOOL HOLDERS as needed from stock at your local mill supply house.

ARMSTRONG BROS. TOOL CO.

"THE TOOLHOLDER PEOPLE"

308 N. FRANCISCO AVE.,
Eastern Sales: 199 Lafayette St.,

CHICAGO, U. S. A.
New York



ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Houses

HITCHCOCK'S *Machine Tool* BLUE BOOK

**Selected
Circulation**

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JANUARY, 1940

THIRTY-FOURTH YEAR

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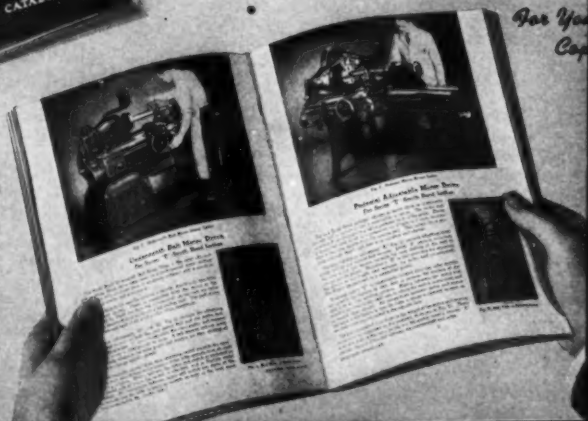
New Catalog of South Bend Lathes

● This new catalog describing the entire line of South Bend Lathes, Chucks, Tools and Attachments is just off the press and is now ready for distribution. It is the most complete lathe catalog ever published. Never before have so many different sizes and types of lathes been illustrated in a single catalog. Every user of machinery should have a copy of this valuable catalog at hand for ready reference.

Write Today
For Your
Copy

Mailed on Request

A copy of this new South Bend Lathe Catalog No. 100 describing 9" to 16" Swing South Bend lathes and accessories will be mailed on request to any address, postage paid, no obligation. Size 8½" x 11" for standard file. Contains 112 pages and 30 illustrations.



16" Tool Room Underneath Motor Drive Lathe

1" Collet, 9" Swing Precision Lathe

SOUTH BEND LATHE WORKS

THE BUILDERS SINCE 1906

786 E. Madison St., South Bend, Ind., U.S.A.



The EDITOR'S PAGE



Looking Ahead . . .

Business prospects for 1940 are reassuring. Heavy industry provided the backbone for the recent upturn. It faces the future with a huge backlog of unfilled orders . . . undoubtedly the greatest since 1929.

Some buying momentum was lost after the initial war stimulation. But orders already on the books should maintain employment at comparatively high levels for a considerable time.

Aircraft and shipbuilding are reported to be dividing an order backlog of approximately \$1,200,000,000.

As the production pace on airplanes and engines is accelerated, payrolls should swell.

The machine tool industry is reported as booked almost solid for the first half of the New Year, with the index standing at 91.2 for November as compared with 52.5 for last January.

In electrical supplies, automobiles, steel, construction, railroad equipment and many other lines, activity is on the increase.

In some quarters, apprehension was felt because consumption has not kept pace with the production rise. After all, consumption is difficult to gauge but generally, it is believed that inventory accumulations have been additions to an abnormally low level. High production has not been maintained long enough for the building of excessive inventories.

Our sincere hope is that the New Year will be bright and successful for all our readers and advertisers.

Greetings . . .

We welcome into our reader family, the officials of 650 important Canadian firms. Also many new readers in South America. From the standpoint of the

advertisers, this is especially significant in view of the current European turmoil.

Contrasts . . .

A recent flying motor trip to the far Southwest provided an interesting study in contrasts. The mountains and desert in New Mexico were refreshingly quiet and peaceful after the hurry and bustle of State Street Christmas shopping. Traveling Southward each day seemed like turning back the calendar . . . from the frosty roads of Illinois to the brilliant sunshine and agreeable warmth of the Southland.

"Progress"

"Progress is a tremendous force in human existence. It sweeps inexorably forward, acclaiming today, as scientific fact that which—10 years ago—was only scientific theory. Frequently, it refutes, in the actual culmination of some scientific advance, the very forward step which—a decade ago—science declared impossible.

"In all of its varied manifestations, progress produces benefits which are incalculable . . . Because of progress in building construction, we have better homes . . . Because of progress in manufacture of household appliances, we have more comforts, greater conveniences . . . Because of progress in automotive manufacture, we have better automobiles . . . Because of progress in transportation, we have faster, more comfortable trains . . . Because of progress in aviation, we have safer airplanes . . . Because of all the benefits of progress, every one enjoys a higher standard of living.

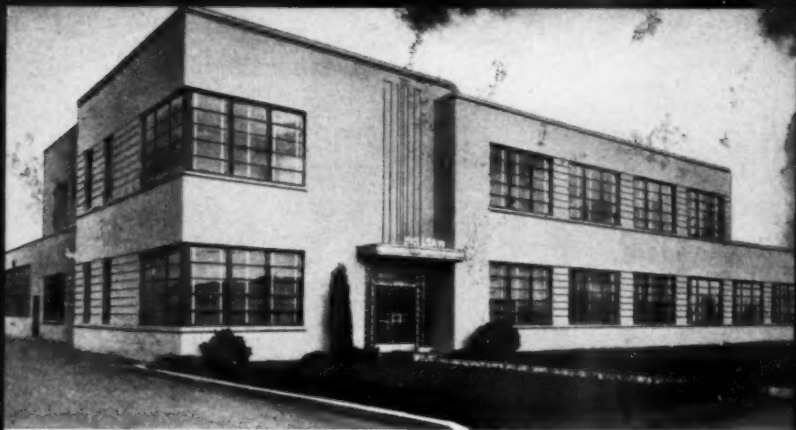
"Progress drives us onward . . . It forbids our standing still!"

(The James F. Lincoln Arc Welding Foundation).

RYERSON STEEL IN STOCK

DAY, you can be sure of the same dependable steel deliveries have characterized Ryerson's service to industry for nearly 100 years. Ryerson stocks of certified uniform high quality steel are ample, varieties are prompt. A special quality control plan on Alloy Steels includes selection of special heats, identification, testing, and heat treatment information on every bar shipped. 10 large Ryerson plants yielding more than 10,000 sizes, kinds, and shapes of steel stand ready to meet both your regular and emergency requirements. Write for Stock List to Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, Cincinnati, St. Louis, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.





PRODUCING the Skilsaw Line

A little journey through the splendid new Skilsaw plant, noting some of the modern equipment and methods used in producing this well-known line of portable electric tools.

PERFORMANCE is the primary basis on which portable electrical tools are selected and used. Graceful streamlined design may catch the eye—ingenious gadgets may excite interest. But after all, the user wants performance. He wants ample power, easy handling and rugged dependability.

Little does he realize the research and study, the careful workmanship and precision manufacturing equipment necessary to deliver all that he expects in his portable tools.

It means building plenty of horsepower into the compact little motors, for space is at a premium. It involves static and dynamic balancing for smooth operation at high speed—precision cut gears—scientific heat treating

and hardening—ball or roller bearings—skilfully designed, accurately made housings that will take hard knocks and withstand hard usage and many other tough engineering problems that the tool user just takes for granted.

All of these important matters receive careful consideration and study at Skilsaw, Inc. Less than 20 years' old, this progressive organization recently moved into a handsome Austin-built factory at 5035 Elston Ave., Chicago—the fourth important expansion during its brief career. And before really getting settled in the attractive and roomy new quarters, an addition is being rushed through to completion which will materially increase the shop area.

L. E. Parker, Superintendent, is in



Glimpse into a busy corner of the Production Department

charge of design and production and he has a capable staff of assistants and helpers. The machine equipment reveals a progressive policy of adopting the latest developments that contribute to betterment of the product. In fact, on almost every visit at the plant new machines are in evidence.

Designs and improvements come into being on the drafting boards, but they are hatched in the Tool Room and Experimental Department. This important section is roomy and well equipped with the products of such well-known firms as Brown & Sharpe, Cincinnati Milling Machine Co., Hendey, Abrasive Co., South Bend Lathe, Gould & Eberhardt, Canedy-Otto, Fosdick, Peerless Saw, Baldor grinders, etc. An unusual assortment of bench and portable

tools is also in evidence.

Cutaway illustrations on these pages of two of the products, reveal details of design and skilfull disposition of internal parts. Passing on into the plant, we'll observe how some of the parts are made.

First of all is a battery of five No. 3 Barber-Colman gear hobbing machines and two No. 12's. These are used in producing the helical gears for the drills — and the worm gears for the saws. Extreme accuracy is necessary, for these gears reconcile motor speeds to the required chuck and saw speeds.

Gear blanks are of chrome-nickel molybdenum stock. Gear wheels are mounted on shafts by means of Woodruff keys. Ground diameters are held to an accuracy of .0005". Pinions are hobbled directly on armature shafts to assure accuracy and to reduce the number of parts. It is very evident that there is no mad rush to raise production. Quality and accuracy are stressed everywhere.

Heat treating and hardening of the gears is handled in the latest type of electric furnaces. Standard practice contemplates the accepted method of meshing a hardened pinion with a heat treated steel wheel for all models of Skilsaw drills.

Spindle threads for the chuck mounting are milled, to assure concentricity and to eliminate chuck wobble which causes oversize holes and breaks drills.

In the final checkup, gears are



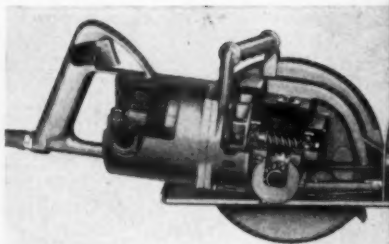
checked for correct depth of tooth and pitch diameter on fixed centers and must be accurate to within .0002". In addition, a Jones & Lamson comparator is used to check for proper tooth shape and correct pressure angle. This interesting testing machine projects magnified shadows of the gear teeth to permit precision inspection.

In the Skilsaws, the circular saw blades run parallel with the motor shafts and compact worm-gear speed reduction units are employed. These right angle drives transmit power to the blades at the most effective sawing, speed and permit maximum depth of cut for a given blade diameter.

Chrome - nickel molybdenum worm blanks are first rough ground. Then each is individually mounted on a splined arbor and hobbled. Then the worms are carefully heat-treated, and the heat-treating is repeated a second time to minimize distortion. Then each worm receives an individual Rockwell hardness test.

Worm threads are then carefully ground to correct any possible distortion. This removes potential causes of friction and assures quiet, smooth running.

Worms receive a final test on a Hanson-Whitney machine to determine cor-



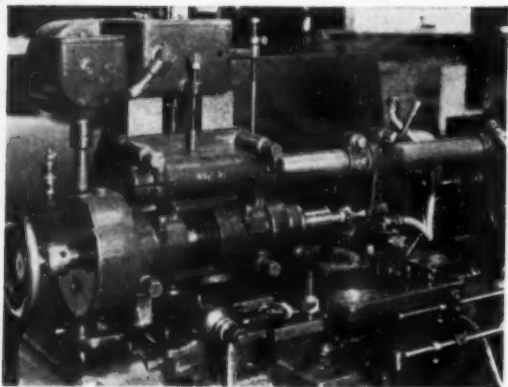
rectness of indexing, lead and helix angle. An accuracy of .0002" is maintained.

The same care is exercised in production of the worm wheels. Blanks are first rough machined from centrifugally cast tough bronze alloy—permanently spline-mounted by pneumatic presses on their individual shafts. Centers are lapped on a new Ex-Cell-O center lap- per. On these centers, the worm wheel teeth are generated. Worm wheels and worm gears are matched and tested in pairs to assure quiet and trouble-free operation.

Although Skilsaws were originally designed for sawing wood, they are now being used extensively for cutting other materials. Fine tooth wheels are



SET STUDS



Gear production requirements are served by a battery of seven hobbing machines. The helical gears are cut from chrome - nickel-molybdenum blanks.

available for Celotex and other soft wall boards — shallow notched steel discs for cutting light gauge flat or corrugated iron sheets by friction or burning — high speed hollow ground blades for cutting sheet and tube copper, brass, bronze and aluminum — and Bakelite abrasive discs for cast iron and metals of low tensile strength, as well as special discs for alloy steels.

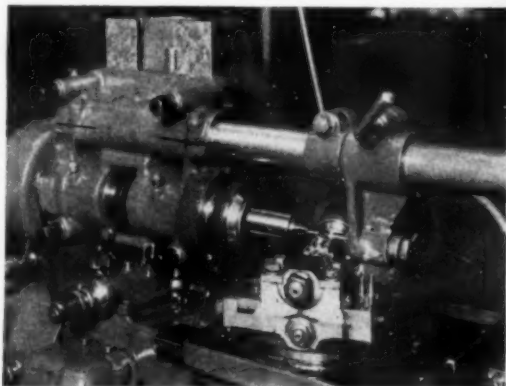
Passing on from the manufacture of transmission parts, we notice a new XL12 Oilgear horizontal broaching machine, used for internal broaching on

aluminum sander drums and similar operations.

Housings for the various Skilsaw tools are vitally important parts calling for skilful design and precision manufacture. In addition to enclosing the motors and other working parts, they must provide accurate mountings for alignment of the bearings, and substantial and convenient handles for holding the tools, while they are being used.

Bodies are of die cast virgin aluminum alloy, which assures accuracy and interchangeability of parts and pro-

Pinions are hobbled directly on armature shafts to assure accuracy and to reduce the number of parts. Hardened pinions are meshed with heat treated steel wheels.



SET STUDS



THE MODERN WAY

For many years, the MODERN Self-Opening Stud Setter has been used by the vast majority of automobile, aviation and other high production plants just as this axle plant does.

Simplicity in operation that gives speed and clear un mutilated threads plus rugged construction make this Stud Setter first choice wherever studs are used—in cast iron, steel, die cast metal or wood.

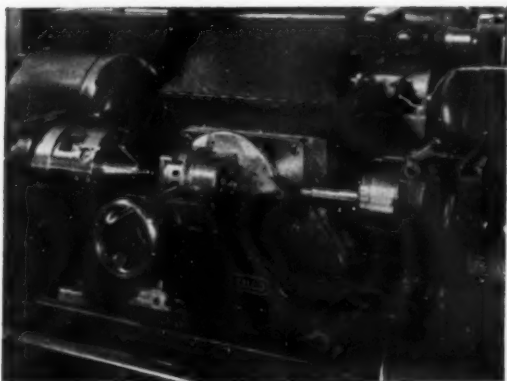
If you are not now using the MODERN Self-Opening Stud Setter, you soon will be, once you learn what it can do for you. Send for Bulletin 185 which gives you more information on this time and money saving tool.

MODERN TOOL WORKS

ROCHESTER

NEW YORK

This clever jig holds the die cast aluminum portable saw body, rigidly and accurately during the boring and turning operation, assuring accurate alignment of the bearings.



vides a dense, smooth surface.

Two new Ex-Cell-O boring-turning machines are used in housing operations. The closeup photos show details of some of the interesting jigs and fixtures. Carbide cutting tools are used and the housings are bored and faced accurately and at a rapid rate.

Another brand new tool is a No. 12 Cincinnati cutter grinder.

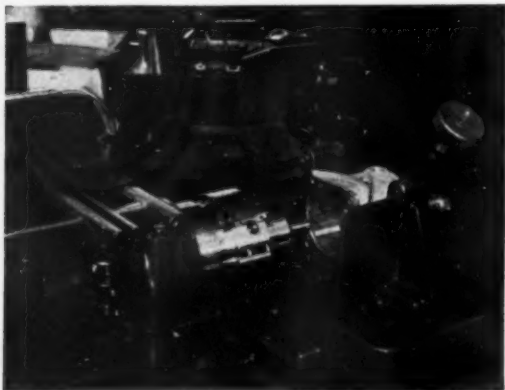
A closeup view shows a Cincinnati No. 2 L-type plain milling machine, equipped with a high speed universal milling attachment arranged for a quill

hand feed. The operation is on a sand-er suction fan housing.

A Kearney & Trecker plain milling machine, No. 13 is also in use on routine operation as well as a new Nichols hand miller.

A Wood turret lathe with tilted turret, Cushman drive and air operated chuck was busily engaged in turning some special brass bushings. Several of the other machines have Cushman drives.

Brown & Sharpe and Norton cylindrical grinders are used for grinding



Another jig which facilitates boring and facing operations on motor housings. The aluminum bodies are slipped into place easily and quickly and interchangeability is assured.

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BODY HARDENED AND
GROUND THROUGHOUT
including TAPER HOLE

NEW and BETTER
GRIP SLEEVE
—easy on
operator's hands

BALL BEARINGS
—eliminate
friction for quick
smooth operation

NEW NICKEL
MOLYBDENUM
ALLOY STEEL
Jaws and Nut

GRIPPING
POWER
greatly increased

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for perfect balance

Removal of Screws
converts Chuck to
HOLLOW
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for Jaws — Nut — Sleeve

COARSE PITCH
THREADS
on Jaws and Nut



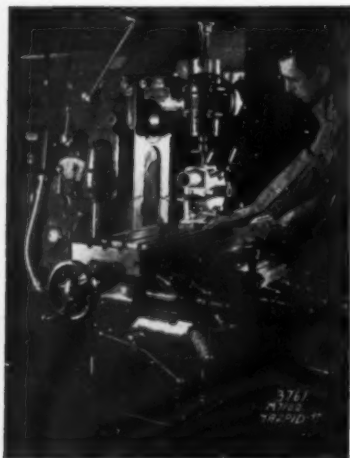
FOR GREATER STRENGTH FASTER OPERATION!

THE JACOBS MANUFACTURING COMPANY, HARTFORD, CONN.

shafts. These shafts are of chrome nickel alloy steel, heat treated for maximum toughness, and bearing seats are ground to .0004" limits.

Radial and thrust bearings in the Skilsaw line are of high quality, ground and lapped.

Two Leland-Gifford multiple spindle drills with four individual motors are used in some of the various drilling operations.



Further drilling capacity is provided by two Cincinnati-Bickford super service drills, and by a number of individual Delta drills throughout the plant.

Three Gisholt No. 3 turret lathes are employed for a number of operations. One of these was busily turning down and facing the die cast aluminum fans which provide ventilation within the tools and cool the motors.

Two Hammond heavy duty grinder-buffing machines are used in outside finishing operations on the housings.

Several Hannifin pneumatic arbor presses handle some of the pressing operations. One of these was pressing together the freshly cemented joints of sander belts. Hand operated Greenard and Sheldon arbor presses are provided at several points in the assembly

line.

A Consolidated No. 24 press punches out oil hole caps and other small parts.

A Grant riveter and a Galmeyer & Livingston disc grinder are also being used to advantage.

Long benches are used for the assembly lines. Here the inspected finished parts are assembled and the completed units pass on to an exacting electrical test.

At the outset of the company's operations, a single electric portable saw was made. A little later the line was expanded to include three models of the saws and a portable belt sander.

The turning point came in 1930, when building activity abruptly halted. The few building contractors who had jobs in progress, hesitated about buying Skilsaws. Attempting to meet the situation, a lower priced model was developed, but this was not the solution. Contractors wanted the higher priced saws but didn't like to spend the money under prevailing conditions.

Then Skilsaw studied the market and discovered the industrial sales possibilities. Previously, some 85% of the business had come from the building field and 15% from industries. Today the business is about equally divided between the building and industrial fields.

Further study revealed that portable drills offered heavy potential volume in the industrial field. This resulted in the development of six models of portable drills which were found inadequate to meet the size range demand already created by competition. This meant Skilsaw could not expect to build or hold a dealer organization with just a partial drill line, and it was decided to enter the portable drill line in earnest with expansion of the line to its present 21 models, adding portable blowers, disc sanders, bench grinders and a hedge trimmer. The business sales curve has shown a steady and consistent climb upward.

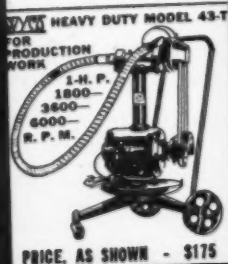
Skilaw's marketing activities are headed by Edward W. Ristau, Vice President, who pioneered with the Company through the sales division, and is in charge of advertising and promotion.



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when you select tools from Catalog
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TOOLS**

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 show a few of
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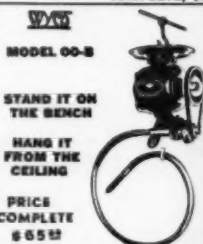
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In this Catalog we introduce the WYCO Concrete Vibrators in either Electric Motor or Gasoline Engine Drives. These are new machines in the vast line of WYCO Flexible Shaft Machines.

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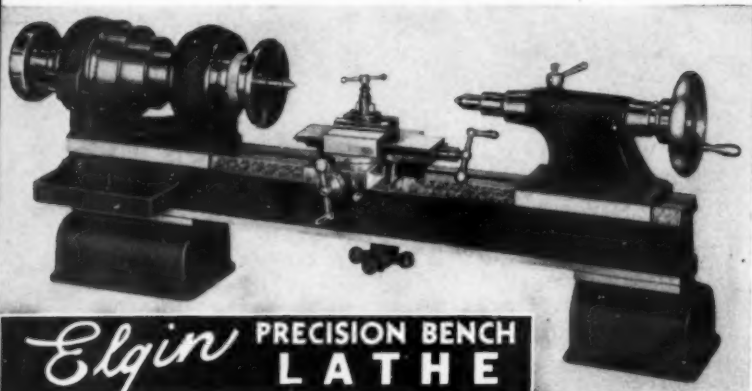
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SUPERFINISHING—

What It Is -- What It Does And Its Influence On Longer Maintenance Of Accuracy

By E. L. Hemingway,

(Experimental Engineer, Foster Machine Co.)

IT WOULD BE interesting, if space permitted, to trace the improvements in machining methods and their relationship to the fits and clearances used in moving mechanical parts since the difficulties experienced by James Watt in building his first steam engine. Considerable water had gone over the mechanical dam from that time up to the development of the automobile. Yet, most of us will agree that the development of our modern machining methods has been mainly due to efforts of the motor car manufacturers to produce a quieter, less costly, and more dependable product.

The lessons learned during the evolution of mass production of automobiles were not wasted upon makers of other mechanical appliances. All of them came to the realization that, only by close attention to proper clearances and good surfaces, could long life and accurate performance be assured to their products. This close study of these two conditions has resulted in increasingly smaller clearances and a demand for improvement in surface quality so that still closer fits can be employed. It would seem, then, that further improvement in the quietness, accuracy, and length of life of many mechanical devices is considerably dependent upon continued betterment of bearing surfaces.

Several questions now arise:—What conditions are essential to bearing surface quality? In what way are those to which we have become accustomed deficient? What are the prospects for their improvement?

What Is Desirable in a Bearing Surface?

It appears to me that the perfect conditions for the bearing surface of a cylindrical part would be as follows:—The surface would be absolutely round and smooth, in perfect alignment with the mating surface, and with the minimum of clearance compatible with proper lubrication. Needless to say, none of these ideal conditions are realized in commercial production; consequently the surface should be as hard as possible to the very outside layer of atoms, so that any mis-alignment would do a minimum of damage.

While, for reasons of economical manufacture, corrosion conditions, or other special reasons, it is often desirable that shafts, etc., be made of soft steels, or other soft metals, instead of hardened steel, it is at least important that they be of as perfect shape and smoothness as is commercially practicable, in order that there be no high points on the surface to rupture the oil film and set up abrasive conditions.

Deficiencies of Common Finishes

Up to this time, by far the largest proportion of manufactured parts have received their final finish by grinding processes. Comparatively few parts with external bearing surfaces have been further improved by lapping; as this method is usually too slow and costly. "Sanding" by means of a strip cloth-coated abrasives has often been resorted to in an effort to better a ground bearing; but close examination of such a surface will usually show it to be ridged.

Grinding has long been in favor as a rapid means of imparting accurate size, and rightly so. However, the quality of the surface so obtained has left considerable to be desired for several reasons.

Among the faults found on the surface of ground parts, are chatter, feed marks and grinding cracks. Also, to my earnest belief, no grinding can ever be done without creation of a layer of disturbed or amorphous metal; and, in case the parts are hardened, a layer of annealed metal in depth from one barely noticeable to one several thousandths of an inch deep. No amount of water flooding the work during grinding can prevent a momentary intense heating of the line in contact with the wheel. This heating may be so intense that the high points of the grinding ridges actually may be decarbonized; thus these points are not only annealed, but also further softened by a reduction in carbon. Lastly, no matter how fine the grit in the wheel, or how carefully the grinding has been done, there still remain those projecting grinding ridges to interlock with similar ridges on the mating part and cause abrading action.

How Smooth Is "Smooth"?

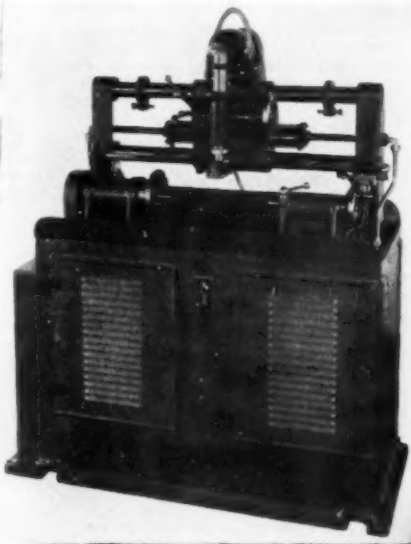
One of the most stubborn obstacles to progress in surface improvement has been the lack of a means of evaluating surface quality. Finger nail and visual tests could not be placed on a blue print. Several devices had been brought out which would give a fair idea of the surface conditions; but none of them was adapted to any kind of routine inspection. However, it has lately become possible through an instrument, known as the Profilometer to inspect any reasonably well finished surface and assign a numerical evaluation to its quality. While the portable model of this instrument does not give any information as to defects such as out-of-roundness, lack of straightness and, ordinarily, as to chatter marks, it does,

accurately and quickly, measure the average depth of machining and grinding ridges.

This aid to surface inspection is making engineers much more "surface quality conscious"; and has apparently ushered in an era of much closer scrutiny of these conditions, as well as an intense desire for their improvement.

A New Development in Surface Improvement

Among organizations so interested was the Chrysler Corporation. It was found that the wheel bearings of cars shipped to distant points by rail or truck had been damaged in a peculiar manner. As these cars rocked back and forth during shipment, the rollers of these bearings had indented the races; and upon unloading and operating, they were noisy, necessitating replacement. A thorough investigation as to the cause of this condition revealed a thin layer on the ground



A general purpose Superfinisher for cylindrical surfaces up to 4" diameter and 18" in length.

surfaces of the bearing races which was somewhat soft and easily indented.

This layer, produced by grinding, was found defective for several reasons. First, the crests of the ridges were readily crushed down or leveled off. The heat created during grinding made this action easy, as the hardening treatment previously given was altered by being annealed to at least the depth of the ridges, and nearly always deeper. Further, the violent tearing out of particles of metal distorted the crystalline arrangement of the surface layer. The grinding of these bearing races, then, produced a surface layer which was soft, often even decarbonized, somewhat amorphous, and much rougher than was desirable.

After considerable experimentation, Chrysler worked out a method of removing this detrimental surface layer, by the application of fine grit abrasive stones to the revolving bearing surface, under light spring pressure, and with a flood of light lubricant to remove abraded particles of metal and stone.

The only motion imparted to the stone is a fairly rapid oscillation of about $3/16$ " amplitude at a right angle to the direction of rotation of the race. Under these conditions there is no possibility of the creation of any consequential degree of heat. For the oscillating motion, there are two reasons. First, the rapid reversal in direction of cut corrects any tendency of the stone to "load." Secondly, the direction of stock removal will be across the ridges caused by the previous operation, reducing the peaks of the ridges to plateaus, or removing the ridges entirely; thus greatly increasing the flat area of the surface.

Compare the surface so improved with the original one as ground. Not only have the grinding ridges been removed, but also the amorphous, annealed and decarbonized layer. The new surface is true crystalline metal. Chatter marks and other small irregularities have been erased. The life of the bearing should be immensely lengthened both from the standpoint of possibility of indentation, and from that of abrasive wear. Its operation will

be quieter and smoother over a much longer period of time.

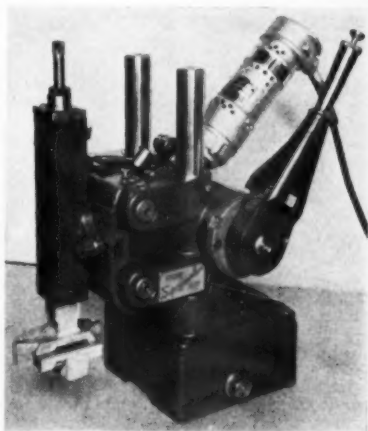
Chrysler gave the name "Superfinish" to this revolutionary method of surface improvement.

Different Applications of Superfinish

The complete success attending the Superfinishing of bearing races naturally led to the adaptation of the process to other parts of the car. Soon it was applied to crankshafts, piston pins, valve stems, tappet bodies and heads, pistons, brake drums and shoes, camshaft bearings, flywheel clutch faces, and other parts, with equal success.

It was found on inspection with the Profilometer that the usual "finish ground" automotive part checked 10 to 35 micro-inches; and that such parts could be Superfinished to a reading of 2 to 6 micro-inches in less than one minute each.

Other applications followed such as the Superfinishing of plug gauges, reamers, boring and pilot bars, rolls for cold finishing metal strip, arbors, and hundreds of other parts on which a truly smooth or hard surface was desired.



Upright type Superfinishing head attachment for cross slide mounting on engine lathes.

Equipment For Superfinishing

The Chrysler Corp. felt that the ben-



Nine spindle high production Superfinisher which has been used on gear and tappet faces.

efits of their patented Superfinish process should not be restricted to their product. Accordingly, they granted a license to manufacture the equipment for application of the process by anyone so inclined, to the Foster Machine Co., of Elkhart, Ind. This Company has constructed practically all of this type of machinery used to date by Chrysler. High production Superfinishers are available for all of the above mentioned automotive parts or any others of reasonable size.

In addition, there is a general purpose machine of 6" diameter by 18" long cylindrical capacity, which can be readily converted for tappet head or other flat finishing. Also, there are three sizes of Superfinishing attachments for mounting on the cross slides of engine lathes.

The positioning of these attachments on the lathe is a very simple matter, nothing being required except a clamping or a filler block. With the proper block at hand, the attachment can be mounted in a few minutes.

The only other requirement observed is that essential for the supply of lubricant to the stone. This usually is a pan under the lathe bed, a tank holding a few gallons of the lubricant, and a small pump. The part being Superfinished is held between centers, or in a collet, just as it would be for turning. In case the part is long enough to require traverse, this, also, is accomplished as in turning.

The general purpose machine is entirely self-contained. All that is necessary to place it in operation is to see that the hydraulic oil and stone lubricant tanks are properly filled. The r.p.m. of the spindle has a stepless range by means of an hydraulic transmission from 0 to 350.

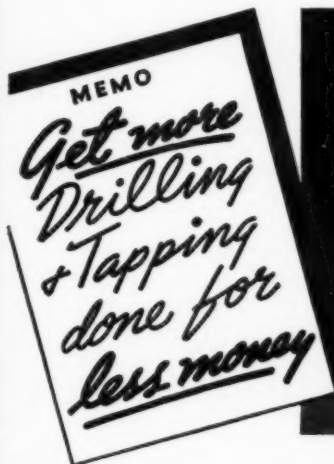
The hydraulic traverse of the stone head is instantly adjustable both as to speed and length of traverse, which is automatically reversed. Work may be held between centers, in an air-operated chuck, or in a scroll chuck.

Control of Superfinishing Conditions

In the operation of any of these machines, there are five easily controlled variables which affect the length of time required for the operation and quality of finish obtained. They are here listed in their order of importance according to my experience:

1. Type of stone selected.
2. R.p.m. or surface footage of the part.
3. Kind of stone lubricant used.
4. Spring pressure used.
5. Traverse per revolution.

To these, might be added two more, the first of which is not ordinarily sub-



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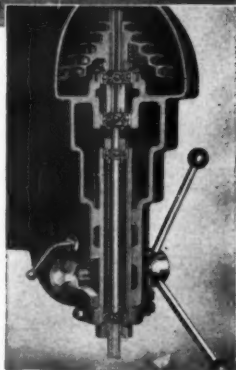
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ject to much adjustment in these machines; and the second of which is controllable only by the grinder:

6. Oscillation speed and amplitude.
7. Quality of surface prior to Superfinish.

Discussing these variables in their order:

Selection of stones is the most important factor in successful Superfinishing. To the uninitiated, proper selection among the hundreds available may seem formidable. Luckily, however, such is not the case. With few exceptions, only one type of bond out of the five available, is suited to this operation, and that is the vitrified. Two kinds of grit are used, the silicon carbide on cast iron, and the aluminum oxide on all kinds of steel. Of the large number of grit sizes made, only six need be employed:—320, 400, 500, 600, 800 and 1000; and I would prefer to use only the 500 and 1000.

The range of bond hardness used is much softer than that found in grinding. The very softest grades available are used in Superfinishing very hard steels and up to medium bond hardness for very soft steels. It is only natural that fine-grit stones will cut a little slower but produce a finer finish than coarse ones. To select a stone to Superfinish a given steel part, then, one would choose a vitrified bond, aluminum oxide stone of a grit size 320 to 1000, depending upon the roughness of the part, and the quality of final finish necessary, with a bond hardness inversely proportional to the hardness of the steel. Six to eight different bond hardnesses will take care of all different hardnesses of steel. Sometimes a shellac bond is useful for work on soft steels under $\frac{3}{4}$ " in diameter.

Selection of a stone for cast iron is made just as for steel, except that the silicon carbide grit is used.

Next in importance to choice of stones is the surface footage of the part being Superfinished. The effects of this variable are somewhat dependent upon the amplitude and speed of oscillation. It can be seen that the path of a selected point on the working face of the stone is a sine curve, the amplitude of which is the length

of the oscillation stroke, and the length of which depends on the relation between the speed of oscillation and the speed of rotation of the part. These curves seldom trace the same path, rather they continually cross each other forming a "cross hatch." Certain factors, such as inertia, limit practical oscillating speeds; consequently the above described lathe attachments have a fixed oscillation speed and amplitude, and the angle of cross hatch is varied only by changing the surface footage of the part.

As compared to the pattern produced in Superfinishing, that of grinding and turning is in a straight line in the direction of rotation. If the surface footage in Superfinishing is low so the angle of cross hatch is wide, the direction of stock removal is at a considerable angle to the original grinding ridges, and is very efficient. Also, as in grinding, Superfinishing stones act soft and free cutting at low speeds and hard at high speeds. Thus, for both reasons, low surface footage results in rapid stock removal.

After complete removal of the previous finish at this low speed, the Profilometer reading will usually be from 3 to 10 micro-inches. Now, if the speed of rotation of the part be increased, the quality of the finish will be further bettered for at least two reasons. The angle of cross hatch will be lessened, resulting in a new direction of stock removal, and the stone will break down less rapidly, or act harder. After a few seconds at the higher speed, the part will assume a brighter finish of from 1 to 4 micro-inches.

The specific speeds recommended are from 15 to 40 feet per minute for roughing; and 50 to 100 for finishing. While two speeds represent the ideal condition for Superfinishing, it is recognized that it is often advisable, for production reasons, to operate at one speed only; and this is entirely practical, finishes of from 2 to 5 micro-inches being readily obtainable. The surface footages for one speed operations vary from 45 to 80 feet per minute.

The stone lubricant has two purposes. First, to wash away abraded particles of stone and metal. Second, by variation

of its viscosity to control the cutting action of the stone. The higher the viscosity, the better will be the finish; but the rate of stock removal will be correspondingly lowered. A mixture of kerosene and International Compound No. 155 has proven to be a cheap and efficient stone lubricant. The mixture will vary from 10 to 20% of the compound, the higher percentage having the higher viscosity. If kerosene is objectionable, any light thread grinding oil may be used undiluted. The lubricant should be applied to the surface of the work just above the stone as copiously as possible without resulting in splashing.

A radical difference, aside from the low speeds employed, is the pressure involved as compared to grinding. In Superfinishing, it is seldom over 20 lbs. per square inch of the working area of the stone. Naturally, the higher the spring pressure, the faster will be the rate of stock removal. And the lower the pressure, the better will be the finish. Recommended pressures in the operation of lathe attachments vary from 2 to 15 lbs. per square inch, and this variation may be obtained by adjustment of a screw incorporated in the machine for that purpose.

The length of a part which may be Superfinished without traverse of the stone lengthwise of the part depends somewhat upon the diameter. It is not usually advisable to attempt the Superfinishing of parts less than $1\frac{1}{2}$ " in diameter over a length of more than 2" without traverse. This length will increase with an increase in diameter up to perhaps $3\frac{1}{2}$ ". Where traverse is necessary, it can be at a rate somewhat in excess of turning feeds. $1/16$ " to $3/8$ " feed is recommended depending upon the diameter.

The quality of finish prior to the Superfinishing operation has a very definite bearing on the selection of stones and the other variable conditions. If a production machine is set up to a definite time cycle, it is unreasonable to expect the same results on a crank ground to 50 micro-inches and on one ground to 15 micro-inches. It has been pointed out that every variable condition conducive to rapid stock removal

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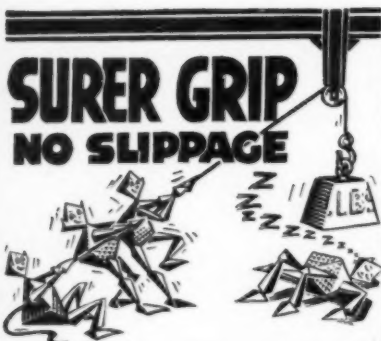
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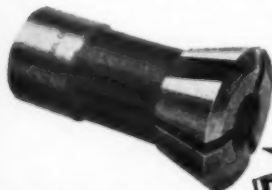
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Accessories for Screw Machines

also results in a higher Profilometer reading. A stone, for instance, soft enough to remove considerable stock cannot be expected to produce the quality of finish given by one somewhat harder.

While the lathe attachments and general purpose machines are capable of removing a turned finish where time is available, there are few jobs where the time element is not of importance. In their use, as well as special production machines, the better the prior finish, the quicker the Superfinishing operation will be performed, and the better will be the results.

Experiences in Sample Finishing

The question of what constitutes a good finish as a base for Superfinish, brings to mind, the varied types encountered in the hundreds of sample parts submitted for trial Superfinish from all over the world. It has been surprising, indeed, to see the variation in what has been presented as a good ground finish; and to find the defects not apparent to the eye, and not detected by inspection with the Profilometer.

A short application of the Superfinishing stone shows up such defects as chatter marks $1/16"$ to $3/8"$ apart, also feed marks of various depths spiraling around the work from $1/16"$ to several inches apart. Further application may show grinding cracks ranging from single ones to patches of "grinding craze" several square inches in extent, hardening soft spots, and, perhaps worst of all, parts annealed in grinding up to a thousandth and more in depth. Such an annealed condition is immediately made apparent to one experienced in Superfinishing, as the soft bond stone chosen with the expectation of working on a truly hard surface will cut far more rapidly, and with a rougher, grayer finish than anticipated.

Peculiarly enough, aviation engine parts have shown at least as much annealing in grinding as those of any other class of manufacture. Yet, this is reasonable, because, in an attempt to produce an ultra fine finish, a very fine grit wheel is used with small cutting capacity, and with generation

of more than the normal amount of heat. Many such parts have been received which were annealed to a depth of a thousandth, rendering them really unfit for use. It would seem that a freer cutting wheel, leaving a finish of about 10 to 15 micro-inches, followed by Superfinishing to $1\frac{1}{2}$ or 2 micro-inches would leave them much more serviceable.

Some of these defects can be removed by Superfinish. Chatter marks are readily erased, feed marks usually with somewhat more difficulty. Sometimes the latter are so deep that their removal results in an undersize part, and the same is true, of course, in removing an annealed skin. So it is evident that the amount of stock removed in Superfinishing is entirely dependent on the previous finish.

Where no serious defects are present, and the Profilometer reading is no more than 15 micro-inches, the stock removal will be no more than one tenth of a thousandth. The average ground job of 20 to 30 micro-inches will show a loss of 1 to 3 tenths, while a turned

piece of work may require from $\frac{1}{2}$ to 2 thousandths to clean up.

The ridged condition of a bearing after "sanding" has been mentioned before. This sort of surface is very pleasing to the eye, and even has a fair Profilometer reading. However, two seconds application of a Superfinishing stone will usually expose these ridges. There is much to be said in favor of rigid abrasive stones as compared to flexible strip or loose abrasives. Their rigidity insures a duplication of true shape.

This recital of the defects of our common finishes, and they are almost always present, paints a rather dismal picture of what we have been using. However, I believe that great improvement in these conditions will be accomplished as these deficiencies become more generally known; and that, through better preparatory methods, together with Superfinish, we shall produce parts which will assemble into mechanisms with smaller clearances maintained over much longer periods of time.



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Wells Develops New Metal Cutting Band Saws

A new No. 9 upright metal and wood cutting band saw is the latest offering of The Wells Mfg. Corp., Three Rivers, Mich.

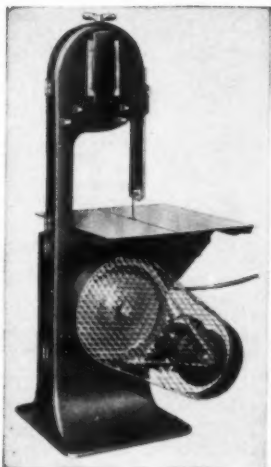
This all around handy saw features four speeds — 60, 90, 250 and 500 r.p.m., covering general foundry, diemaking, patternmaking and sheet metal working requirements from tough metal to sheet metal and wood.

Grease-sealed New Departure bearings are used throughout.

Reduction gears comprise one cast iron and one non-metallic helical gear, running in oil.

Wheels are of cast iron, designed for narrow blades for contour work, as well as the regular $\frac{1}{2}$ " wood or metal blades.

The 26" x 28" table is of heavy metal plate, bolted through structural steel bars to base. Throat size is $11\frac{3}{4}$ " x $15\frac{1}{2}$ " height.



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SOLVING Inspection Problems By PROJECTION

(The first article in a series of three on Projection Inspection.)

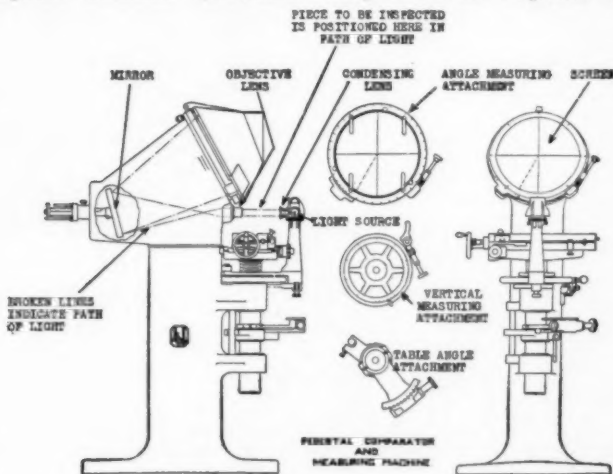
By John W. King,
Jones & Lamson Machine Co.

PROJECTION inspection is receiving ever widening acceptance because its use solves many inspection problems which are difficult or impractical to handle by other means. Figure 1 shows the principle parts of a projection comparator and measuring machine. The part to be inspected is placed in front of the objective, in the path of the light beam, so an enlarged outline of the piece or portion of the piece being inspected is cast upon the screen. This enlarged outline may be from 10 times to 100 times the actual size of the piece, depending upon the magnifying power of the lens system. Often maximum and minimum outlines of the part to be inspected are drawn on the screen, at the magnification used. Then it can be seen at once, whether or not a given piece falls within acceptable tolerance. (Projection

inspection is a precision method for measuring both angles and dimensions. Dimensions so determined are accurate to 1/10,000 inch).

A typical difficult inspection with mechanical gages is inspecting the lead and form of round top and bottom buttress threads, such as used on airplane cylinders. Accurate inspection of such threads with mechanical gages would test the ingenuity of experienced inspectors. Yet with projection, an inexperienced operator can tell quickly and accurately if the thread form and lead are correct, however unusual may be the thread form. (See Figures 2 and 3).

The accurate inspection of forming tools by means other than projection is often time-consuming and costly; especially if the tool inspected has radii,



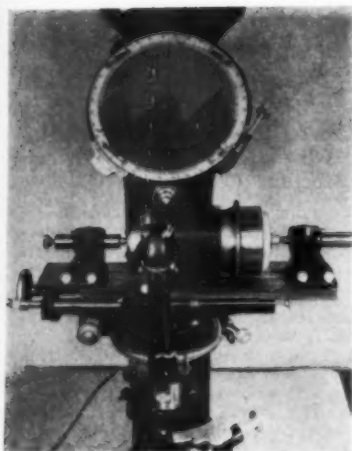


Fig. 2—Closeup of a Comparator set-up for inspecting buttress threads on airplane cylinders.

or complicated contours. But projection requires merely positioning the forming tool on the comparator work table, in front of the lens. Whether the tool is acceptable may then be de-

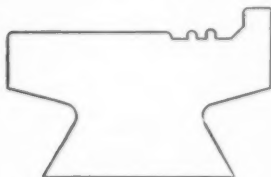


Fig. 4—One of many form tools which are difficult to measure mechanically. To inspect this tool with an inspection Comparator and measuring machine, only a simple chart with right angle lines and a series of radii is necessary, in addition to the Comparator. This principle is used in measuring form tools, profile gages and for general contour inspection. When it is desired to measure several tools, gages or production parts of duplicate shape, the contours may be compared against an enlarged master outline, as mentioned in the case of buttress threads on airplane cylinders.



Fig. 3—Line drawing of the chart used in the Comparator for inspecting the buttress threads on the airplane cylinder shown in Fig. 2. Charts are drawn with ordinary drawing ink on celluloid or tracing paper. (Pencil is sometimes used and some charts are made by etching lines on glass screens). Ordinarily only a few minutes are required to draw a typical chart. Drawing charts for accurate inspection work does not call for unusual skill on the part of the draftsman, because at 100 magnifications, for example, $1/1000$ th inch on the work shows as $1/10$ th inch on the screen. Therefore, if the chart is accurate to $1/100$ th of an inch, the chart can be used to measure parts to an accuracy of $1/10000$ of an inch. (Broken lines are used in drawing charts so the operator can tell just where the outline shadow of a piece falls.

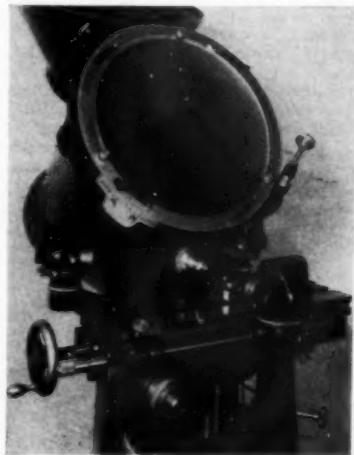
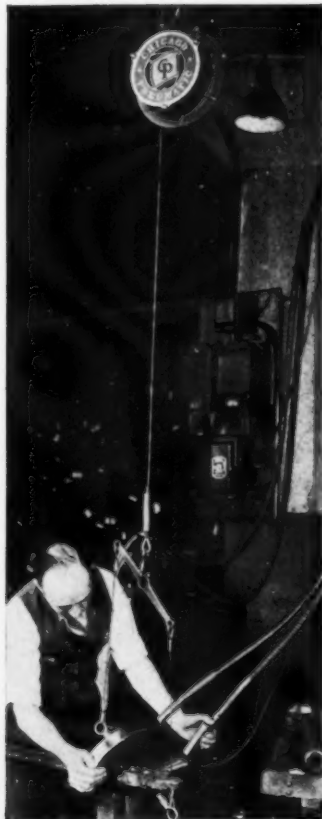


Fig. 5—Setup for inspecting diamond tools.

termined by comparing the shadow with an outline of the tool drawn on the screen; or the dimensions may be measured directly without an outline on the screen; using only right angle lines and a series of radii drawn on the screen. (See Figure 4). Projection is especially valuable for inspecting cutting tools with accurate radii, as

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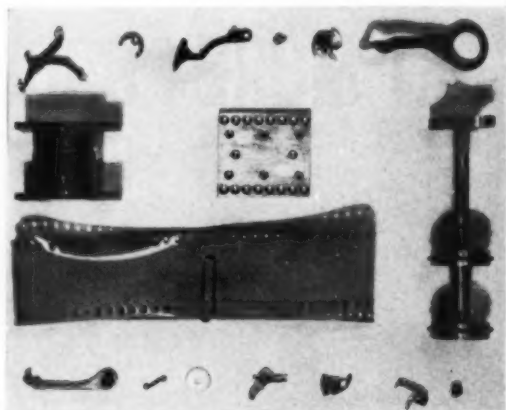
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Fig. 6—Movie film, punch and die and camera parts, all of which are inspected by projection. The punch is at the left, just above the center of the illustration.



on many carbide and diamond tools. Such radii are easily and accurately measured by comparing their enlarged outlines with true radii drawn on the screen to the desired magnification. (See Figure 5).

Many punches and dies are now inspected by projection which formerly took hours of tedious inspection. Typical punches and dies inspected by projection are used in movie film manufacture. (See Figure 6). These punches and dies must be very accurate. The punch is inspected by reflection; that is the reflected image of the punch

face is cast on the screen for measurement. This reflection feature is used widely for inspecting type faces as well as all sorts of punches. The method has many unique applications, such as inspecting split neck ring molds for manufacturing fruit jars and bottles. (More about inspecting reflected surfaces will be given in the next article of this series). The die used in conjunction with the punch is inspected in the more usual manner by projecting directly an enlarged outline onto the screen. The shapes of the punch faces and die holes are measured by com-



Fig. 7—Neck ring molds and other parts used in the manufacture of glass products. Also some of the finished glassware, all of which are inspected by projection.

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paring their shadows with master outlines. The distance between the die holes and the distances between the punch faces are measured directly.

Often for sales or engineering purposes, it is highly advantageous to have definite records of the accuracy or inaccuracy of given pieces. Such records, of pieces within the range of the machine, are obtained easily by using a photo plate holder which clamps over the projection screen. These photographs show the pieces at the exact scale of the magnifying power of the projection machine. (See Fig. 8).

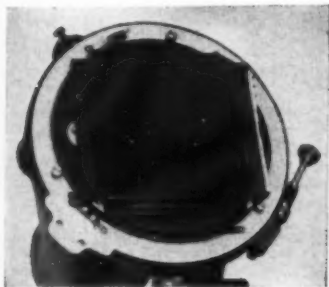


Fig. 8—Adapter with photo plate holder placed over Comparator screen for making photographic records.

The accurate inspection of internal threads is difficult ordinarily. But with projection, it is a matter of making a cast of sulphur and graphite. The molten material is poured into an adapter held against the threads of the portion to be measured. When the cast has hardened, the adapter holding the cast is placed on the comparator to measure the thread form, lead, etc. For the manufacture of accurate internal threads on a production basis, the tap, thread mill, or the form produced by the grinding wheel, should be inspected first by projection to see if the form of the tool is correct. In the case of taps and gages, the lead should also be inspected. Then the first threaded part produced should be inspected with a sulphur cast to make sure that both the form and lead are correct. After a

satisfactory set-up has been made, all the inspection necessary is the inspection of an occasional piece, thereby checking the set-up and amount of tool wear.

The foregoing examples were chosen as typical of the hundreds of projection installations in tool shops and machine shops. Even so it is interesting to mention that each of the large industries including the automobile, airplane, electrical, textile, etc., also have hundreds of projection inspection installations. Many smaller industries find it highly profitable to have sizeable numbers of projection comparators. In conclusion it can be noted that projection inspection continues to be used in more and new fields everyday because each difficult inspection job solved by projection suggests opportunities for inspection and production savings on other products. The next article in this series will describe several unusual applications of projection inspection.

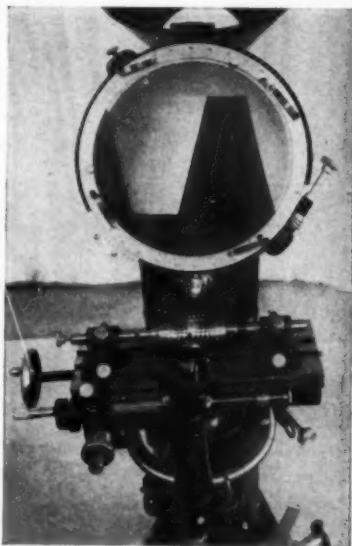


Fig. 9—Setup for inspecting thread worm.



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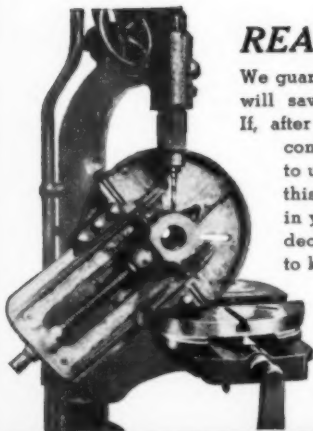
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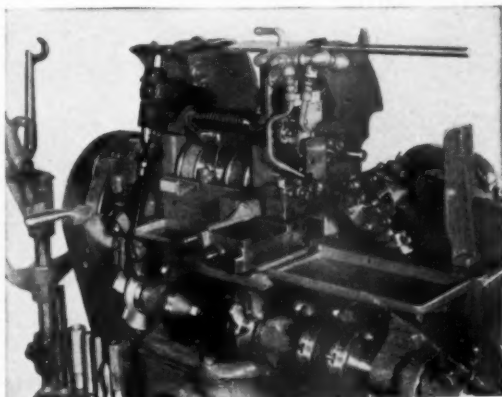
B&S Expands Screw Machine Attachment Line

Several new items have been added recently to the Brown & Sharpe line of automatic screw machine attachments. Of these, the new longitudinal turning attachment is intended for the Nos. 00 and 00G automatic screw, turret forming, cutting-off and screw threading machines (high speed). The illustrations show the attachment on a model 00G and a closeup of the tool slide assembly.

This is essentially a vertical slide attachment provided with longitudinal movement. In addition to performing any vertical slide operation, it will also do straight turning to 1" in length. It is particularly useful turning behind a shoulder in that it eliminates the need of a swing tool. Turning is accomplished independently of other operations and with the spindle running in either direction. Since the attachment is rigidly mounted and of sturdy construction, comparatively rapid turning is permissible.

The vertical and longitudinal movements are both actuated by cams on the cam shaft of the machine. Each cam moves a bell crank, link and rack. The vertical movement rack turns a shaft which operates a pinion and rack in the tool slide to produce vertical movements of the slide. The other

rack mechanism imparts longitudinal movement to a sleeve on the vertical movement shaft and thus to the tool

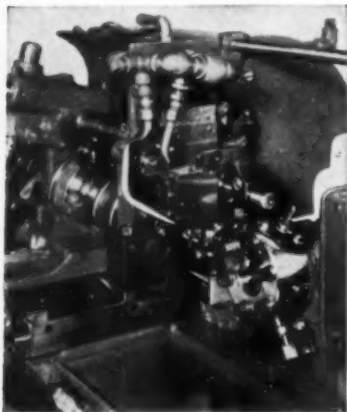


slide assembly, attached to the end of the sleeve. A spring acting on the rear of the vertical movement bell crank and another acting on the longitudinal movement sleeve keep rollers on both bell cranks in contact with the cams. Turning tool blade, tool wedge and two cam blanks are furnished with the attachment.

Motor drives for drill spindles of cross drilling attachments are also available for Nos. 00G, 0G and 2G automatic screw machines (high speed).

Motor drives are also offered for turret drilling attachments on the same models. This equipment includes everything necessary to drive by motor, the drill spindle assemblies of the turret drilling attachments.

Still another attachment provides for motor drive of the cross drilling and turret drilling attachments by the same motor. This arrangement combines the functions of two drives already mentioned.



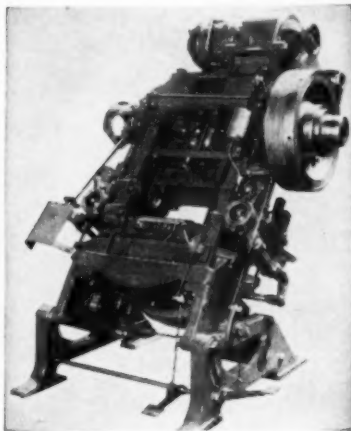
Full details are given in bulletins 1091.5 and 1092 which may be obtained by addressing Brown & Sharpe Mfg. Co., Providence, R. I.

Bliss No. 645 High Production Press

The E. W. Bliss Co., 53rd St. and 2nd Avenue, Brooklyn, N. Y., announces that inclinable mountings are now available for their No. 645 series of "Bliss" high production presses. This is a special feature which allows the machine to be operated in any one of three optional positions. The square pockets in the legs of the press support the machine. The makers emphasize that this is a very practical feature, inasmuch as the press can be used for work which is blanked through the dies and bed while the press is in an upright position. It can also be used for work that is either ejected by the bar knockout or returned to the surface and discharged

by gravity while the press is inclined. Adjustable cam knockouts are also available.

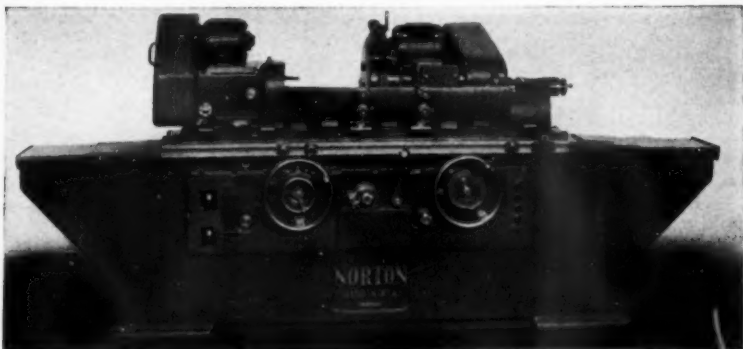
The press is equipped with precision type bronze lined gibbing which is adjustable to .0005", bronze ball seats for the connections and bronze bushed main bearings with automatic force feed lubrication. The Bliss high speed rolling key clutch with its auxiliary fittings and compactness of all moving



parts, assures speedy action of these presses. The precision type feed with hardened gearing, hardened rollers and pins is also available. Bolster and clamping cap are so designed that the dies are easily set and tried out without returning the press to the vertical position. Operating speed of the press is under control of a variable speed drive unit that adapts the machine easily to a wide range of work. In this case, the operating speed is from 100 to 300 strokes per minute. The press shown is designed for 65 tons.

Norton Presents a New 10" Type C Line

While bearing the same type designation as the earlier model, a number of refinements are incorporated in the



new line of 10" cylindrical grinders announced by Norton Co., Worcester, Mass. The most outstanding change has been in general appearance, a feature that necessitated a completely new base. Provision has been made for suspending oil and coolant pumps vertically on springs so that the pumps now run submerged. Oil and coolant reservoirs are an integral part of base. At rear of base is a large, cored receptacle in which all the motor starting equipment is mounted, isolating it completely from dust or moisture.

Wheelside and table ways are pressure-lubricated from a separate system thus permitting the use of oils of different viscosities for strictly lubricating purposes and as the hydraulic fluid for operation of the various units so controlled.

Vee belts and a silent chain running in oil drive the headstock which has been redesigned. Likewise the footstock has been changed. Large spindles and centers assure more rigid support and contribute to the betterment of the surface finishes produced.

Type C machines are available with hand, hydraulic or mechanical traverse of the table. A semiautomatic model is also built which can be arranged for either hand or hydraulic table traverse. In addition, semiautomatic machines are usually equipped with hydraulically

operated footstock and headstock. Often a hydraulically operated steadyrest is also supplied. It is a plunge-cut machine and parts are ground with the operator simply placing the work between the centers and moving a single lever which initiates the following functions:

1. Work centers close
2. Wheel slide advances rapidly.
3. Work rotation begins.
4. Rapid advance of wheel is decelerated to grinding feed.
5. Wheel feed arrested by a positive stop and wheel dwells for final finish and size.
6. Wheel slide retracts rapidly.
7. Work rotation stops.

Operation of the lever withdraws footstock center and operator removes work from machine. Because of its automatic features, frequently one man can operate two machines resulting in very high production.

Semiautomatic machines can also be arranged for manual control. In this case the operator places a dial gauge on the work and from it observes when correct size is obtained. Moving the lever then withdraws the wheel slide rapidly and the gauge is lifted from the work which is released by a further movement of the lever.

Machines can be converted from manual to automatic control merely by turning a convenient switch on the front.

Geometric Develops Additional Precision Threading Machines

Two new models of precision threading machines, the Nos. 16 and 11, supplement the No. 14 which was announced by Geometric Tool Co., New Haven, Conn., last year.

These machines are intended for the threading of duplicate parts where precision and quantity production are paramount considerations.

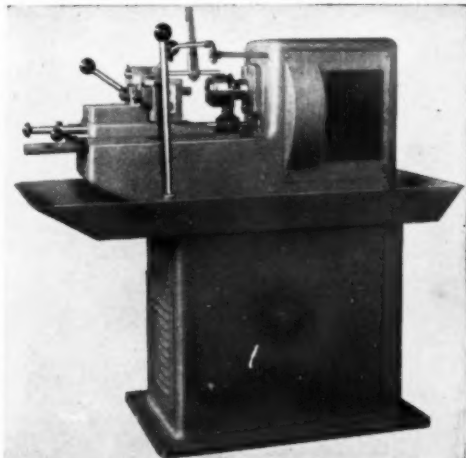
The No. 16 illustrated, will cut threads up to 1" diameter in National Coarse Thread Series, and sizes up to 1½" in fine pitch threads.

The No. 11 is a bench model and although intended primarily for small diameter, fine pitch threads up to 5/16" diameter, may be used on finer pitches up to 9/16" diameter.

A unique feature is the flexibility offered in the way of work holding devices. Machines may be purchased with merely the machine platen and the user can make his own work holder. Or they can be supplied with a standard two-jaw vise or with a standard holding device. Special work holders can also be made up on special order.

Either the style KD Geometric rotary die head with milled or tapped chasers or the style TR Geometric ro-

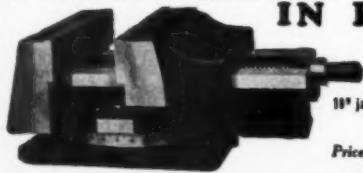
tary die head employing tangent or circular chasers may be furnished at the purchaser's option.



An ingenious and effective method maintains vertical and horizontal alignment. Opposed adjusting screws with an unusual pivoting arrangement of the carriage enable the user to keep the work holder in accurate alignment with the die spindle at all times.

The many new and interesting features are fully covered in a new 12-page bulletin. There are numerous large size detail photos, drawings and specifications which leave little untold.

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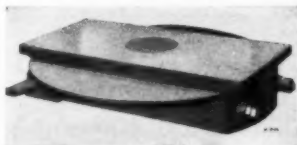
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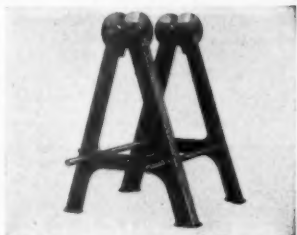
High quality, big value, and a wide range of usefulness, make Sundstrand Open Line Tools easy to sell; insure customer satisfaction; create many opportunities for more profitable sales.

Sundstrand Index Bases speed up production, reduce machining costs. Built low, compact; they have easy single-lever clamping, manual or automatic indexing. Suitable for all makes of machines; made in six sizes.



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Sundstrand Balancing Tools are sensitive, durable; have many uses for balancing gears, shafts, flywheels and similar work, and for straightening or truing operations. Nine sizes range from Super-sensitive Bench Type to No. 5 Heavy-Duty, 24,000 lbs. capacity; and all are portable except No. 5.



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Rusnok Motor-Driven Milling Attachment

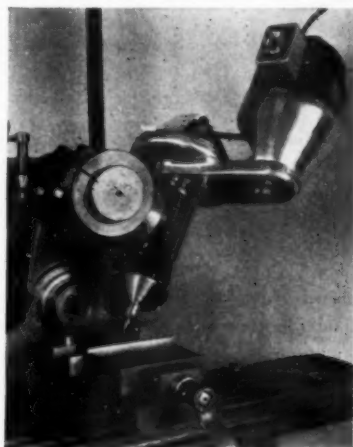
A new all-duty, high-speed motor-driven milling attachment has been perfected by Rusnok Tool Works, Chicago. It will be marketed by Lockwin & Co., 205 West Wacker Drive, Chicago, Ill.

The attachment is designed to convert a horizontal milling machine into a universal milling machine. It fits all round overarm milling machines and operates at any angle. Can be set easily for single or compound angle milling.

The spindle is mounted on 3" Timken precision roller bearings and is designed for a No. 9 B & S taper shank holder for end mills or taper shank end mills of the drawbar style. End mills of smaller sizes of the straight shank type can be used in the holders. But two sizes of holders are needed to handle the complete range of end mill sizes from 1/16 to 3/4".

A positive action thermostatic switch is provided on the 1/2 h.p. motor.

This versatile attachment has many useful applications in general manufacturing, mould and die making, tool room and pattern making and in the construction of special tools, jigs and



fixtures. It should also be useful for recessing operations on tool shanks in preparation for Tungsten Carbide tips, surfacing, keyslotting and a wide range of jobs with end mills, small angle cutters, slitting saws, etc.

An attractive four page bulletin will be sent on request.

Transfer Screws in SAE Sizes

Due to growing demand for S. A. E. sizes in transfer screws, Nielsen Tool & Die Co., 1859 Gardner Ave., Berkeley, Mich., are now tooled up to produce these along with U. S. S. sizes.



These transfer screws facilitate the transferring of blind screw holes in dies and to a great extent eliminate chance of errors, as the centers and drill circles are sunk into the steel from .010 to .015".

The makers will gladly send full details.

Jan. 1, 1940

**NO INCREASE
IN PRICE**

of

CARBOLOY

DIAMOND DRESSERS
For Dressing All Grinding Wheels

Write for Catalog DR-38
CARBOLOY COMPANY, INC.
11139 E. 8 Mile Road, Detroit, Mich.
Chic. - Cleve. - Newark - Phila. - Pitts. - Worcester, Mass.

Conway

Clutch Sheaves

Here's another popular application of the versatile Conway Clutch—for modern multi-V-belt drives.

In this, as well as the numerous other industrial applications, Conway Clutches are in step with the trend in modern machinery toward higher speeds and lighter weight.

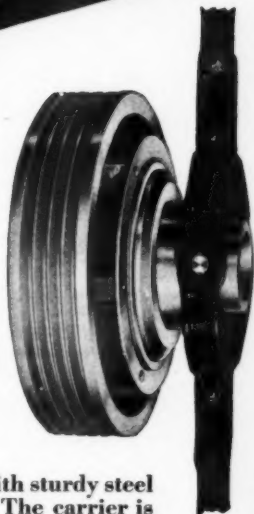
Conway meets the new stress factors with sturdy steel plates that withstand sudden torques. The carrier is rugged and the husky actuating levers are pivoted to the rigid clutch carrier, in contrast to the practice of attaching levers to flimsy floating rings.

Centrifugal force, the traditional enemy of clutch performance, is utilized in the Conway to aid release and insure against drag. When the shifting cone is withdrawn to disengage the clutch, centrifugal force pulls out and holds out the levers, thus keeping the plates apart.

Safety and neatness are achieved by enclosing the parts usually dangerously exposed in other makes. All of the good, proved features of old type clutches have been modernized and retained.

Conway Clutches are conservatively rated—and we offer them to you as *the last word in friction clutches.*

Have you Conway bulletins P-24, L-28 and XYZ-L on Disc Clutches, S-10—Overload Release and Slip Clutches,—No. 36-A Compression Clutches—K-32—One Revolution Clutches, E-8—Expansion Clutches?



THE CONWAY CLUTCH CO.

1541 QUEEN CITY AVE.,

CINCINNATI, OHIO

Displaying "Budgit" Portable Hoists

This unique display is used at trade conventions and exhibitions to focus attention on "Budgit" portable hoists—and to emphasize that they may be plugged into any handy lamp socket.

Of more than passing interest from a design standpoint is the fact that the display stand is built up of steel bars and plates, fabricated into a one-piece unit by the ShaWeld process—a new method of fabrication employing flame cutting and arc welding.

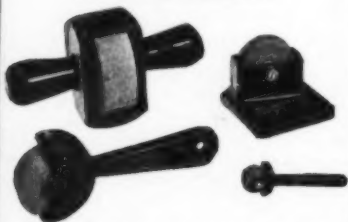
The hoists are available in 250, 500, 1000 and 2000 lbs. lifting capacity, with speeds to suit today's tempo. To use, all that's necessary is to hang up, plug in and let the hoist do all the work.

A new catalog gives the whole story and a "Time Savings Calculator" shows the savings "Budgit" hoists earn. Address the Shaw-Box Crane & Hoist



Div., Manning, Maxwell & Moore, Inc.,
435 Broadway, Muskegon, Mich.

ABRASIVE WHEEL DRESSERS



KEEP GRINDING WHEELS SHARP AT LOW COST. SPECIAL DRESSER FOR SURFACE GRINDER GIVES HEAVIER CUT WITHOUT BURNING.

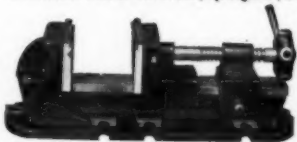
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M & S DRESSER
377 CORNWALL ST.,
HARTFORD, CONN.

GEM VISES "For The Tough Jobs"

Our circular shows 6 different sizes and types of GEM VISES for Drill Press, Mill, Planer and Grinder work.

J.E. Martin Tool & Die Works, Springfield, O.



GRIND THE EASTERN CENTERLESS WAY

ACCURACY-FINE FINISHES-LOW COST
Large or Small Lots

EASTERN CENTERLESS GRINDING CO.
624 Capitol Ave., Hartford, Conn.

Mall
TRADE MARK**PNEUMATIC
SANDING DRUMS****ADD EFFICIENCY
AND ECONOMY
TO ALL
INDUSTRIAL
FINISHING*****MALL Pneumatic sanding drum—size 3"x6"***

The wide-spread use of this air-cushioned metal finishing wheel is convincing proof of its efficient and economical performance. It holds the abrasive firmly in place to provide a clean, even cutting action—free from chatter.

It leaves a fine draw file surface on all metals and other materials in a minimum of time and with minimum effort. Its universal application to all models of flexible shaft machines eliminates the need for special equipment.

The low cost of this all-purpose finishing tool is quickly absorbed in savings on time, labor and abrasives. Arrange **TODAY** to incorporate this **MALL Pneumatic Sanding Drum** into your production program.

Complete information will be furnished on this tool and **MALL flexible shaft grinders** without obligation.

MALL pneumatic sanding drum in use on a MALL flexible shaft grinder.

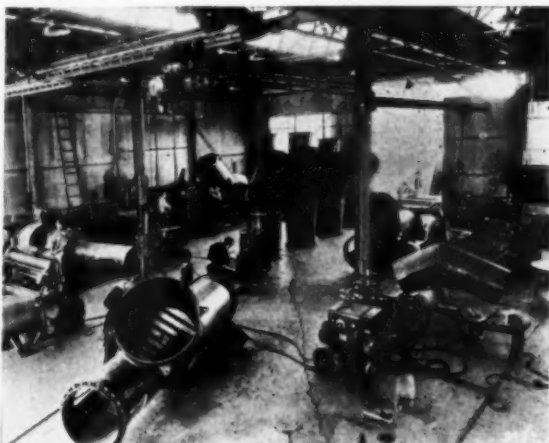
MALL TOOL COMPANY**7742 SOUTH CHICAGO AVENUE CHICAGO, ILLINOIS**

Hobart Welders Help Pump Construction

and with a total connected load of 3800 h.p.

A large pump order recently completed by the Pomona Pump Co., of Pomona, Calif., consists of 16 huge Mixflor vertical pumps for the Contra Costa high line canal, a part of the great Central Valley Water Project.

These 16 pumps are used as canal lifts and were installed in four pumping stations, 4 pumps in each station, successively lifting over five million gallons of water per hour through four lifts varying from 25 to 50 feet in height,



They were completely built and fabricated at the Pomona factory, and weighed a total of 40 tons. Approximately 75% of this weight consisted of the discharge elbows and base mountings which were shaped and fabricated from rolled steel plate and shaped in Pomona Pump Co.'s own modern welding shop.

Through this shop is continually flowing the production of many similar large units—some with individual parts requiring very intricate and accurate placing and welding vanes and supporting hub centers to give correct hydraulic performance.

The Pomona welding shops, a bay of which is shown, are well equipped to turn out these large units efficiently. Cutting and trimming is done entirely by the oxy-acetylene torch and the welding is almost entirely done by the Hobart with several 200 amp, 250 amp, and 300 amp portable electric arc welding machines. Welding and all general fabrication on these large pump units calls for especially high class workmanship and quality of welds, which on this large job and on all other such

Precision Collet Chuck

NO VIBRATION means longer drill and end-mill life. Our 8-point collet grip gives perfect centering, and allows short drill-projection, by gripping equally well on shank or flutes.



Sizes, $\frac{1}{2}$ " diam. to No. 80 drill.

7 BIG POINTS



8-Point Grip. High Accuracy. Faster Operation. Less Drill Breakage.

Parts Interchangeable.

Unusual range per collet.

Holds on flutes—Broken drills can be used.

Pat. Pending

For Fewer Breakages—Use "Ericksons"

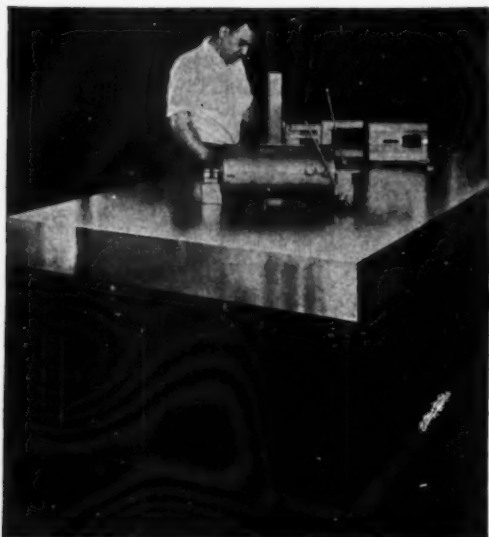
ERICKSON STEEL CO.

East 80th & Bessemer,

Cleveland,

Ohio

SAVE TIME ON PRECISION WORK



ARC-WELDED All-Steel Frame

Optional equipment. Absolutely rigid—has strength of one-piece construction. Provided with 32 lock leveling screws which enable user to level plate quickly and accurately. Screws can be locked securely.

CHALLENGE *Semi-Steel* LAYOUT SURFACE PLATES

● Wherever a true, rigid, smooth surface is required for assembly and inspection, Challenge Semi-Steel Layout Surface Plates are highly recommended. They are made of the finest grade iron and steel and planed perfectly smooth and square. Their use in many leading industrial plants has accounted for pronounced savings in time. Challenge Layout Surface Plates are furnished in one standard size, 48x96 inches, with or without steel stand; special sizes on order. Mail coupon for free catalog and price list today!

THE CHALLENGE MACHINERY CO. ♦ GRAND HAVEN, MICH.

CHICAGO, 17-19 E. Hubbard St.



200 Hudson Street, NEW YORK



FREE CATALOG—Illustrates and describes Challenge Time- and Labor-Saving Devices for Tool and Machine Industries.

Name _____

Full Address _____

jobs must pass rigid government inspection by Reclamation and U. S. Navy engineers.

The technique calls for welding mild steel and Corten steel plates and shapes varying from $\frac{1}{4}$ " to $1\frac{1}{4}$ " in thickness, and all types of welds and in all positions. Steel fabrication in large pump units is becoming very popular with reclamation engineers and is rapidly supplanting the cast iron construction of other days.

ALL ALLOY PORTABLE SHEARS
FULLY GUARANTEED
 Two Sizes



No. 1 cuts up to No. 11 gauge strip or sheet.
 No. 2 cuts up to $\frac{3}{4}$ " steel plate.
 Special Blades for shearing stainless steel.

BREMIL MFG. CO.
 1720 Pittsburgh Ave., Erie, Pa.

GRANT RIVETERS



include both Noiseless Spinning and Vibrating Hammer types of machines — also Vertical and Horizontal Multiple Spindle Spinning Machines.



You're invited to send unriveted samples for recommendations and quotations—NOW.

THE GRANT MFG. & MACHINE CO.
 C. E. Station
 BRIDGEPORT, CONN.

Washer Firm Publishes New Stock List

The Wrought Washer Mfg. Co., Milwaukee, Wis., important producers of washers, expansion plugs, stampings, tools and dies, serving many industries, has announced the publication of a new stock list—No. 55-C—available to manufacturers upon request.

This new publication lists thousands of washer specifications in various materials, including steel, brass, copper, aluminum, fibre, etc. carried in actual inventory available for immediate shipment. Those sizes permanently maintained in stock are so designated, thus enabling manufacturers to select for standard production as well as new assemblies the particular sizes on which they can always obtain prompt delivery.



Nozzles for Oxy-Acetylene Gouging

A series of new oxy-acetylene gouging nozzles, for use with a standard

CARROLL Universal Dividing Heads
 22 Years of Popularity. 6", 10 $\frac{1}{2}$ ", 12" Swing. Right or Left Hand Type.



Rigid, Accurate, Long-Life.

WM. CARROLL & SON
 1776 Lexington Ave., (Norwood) Cincinnati, Ohio

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MAIN OFFICE AND WORKS: STATEN ISLAND, NEW YORK

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200 BROADWAY

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CLUTCH OR CONE DRIVE

*Our High Speed Tappers
are Super-Sensitive for
Small Tapping*



Style D-E, Quick Change Tools



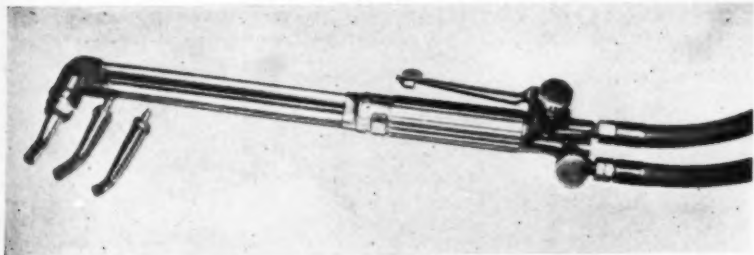
NEW ROCKFORD PRESSES

*Built for exceptional
SERVICE*

Engineered for super performance and long life, you'll find in the New Rockford Presses, every modern advance—Chrome Nickel Crankshaft, Hard Bronze Bushings, Timken Bearing Back Shaft, to mention just a few.

There's a model for every requirement—and all are backed by more than 30-years' experience in press building. May we tell you more—and send a copy of our complete catalog?

ROCKFORD IRON WORKS
ROCKFORD—ILLINOIS



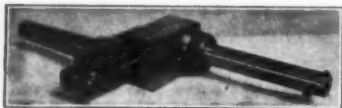
hand-cutting blowpipe, such as the Oxweld C-32 is announced by The Linde Air Products Co. Available in three sizes, the nozzles provide a means for quickly and accurately removing a narrow strip of surface metal from steel plate, forgings, and castings.

The nozzles are designed to deliver a relatively large jet of oxygen at low velocity. By proper manipulation of the blowpipe, a smooth, accurately-defined groove can be cut or gouged out of the surface of the metal. By using various standard size nozzles and man-

ipulations, the groove can be varied in width and depth at the will.

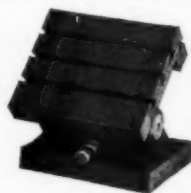
Important uses for these new nozzles are:—gouging the underside of electric welds; removal of weld metal, such as temporary tack-welds and defective welds; preparation of plate edges for welding; and maintenance and scrapping operations. A wide field of miscellaneous uses include gouging in metal-shaping and trimming processes.

Further information about the new Oxweld gouging nozzles can be obtained from the nearest Linde office.



MODERNIZE present equipment with a **RUSSELL BORING BAR**. Bores 9/16" to 12" dia. with boring axis parallel to shank axis. One compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.
MIDDLETOWN, OHIO



McMAHON

Adjustable Angle
Plate

For grinding any
angle accurately.

Two sizes

Model "A" with T slots

3 1/2 x 3 1/2 \$12.

Model "D" with top hole

6 x 7 1/2 \$30.

Desirable territory

open for dealers

FRANK McMAHON CO., 142 JUNE ST., DAYTON, O.



- FAMCO -

**ARBOR PRESSES
FOOT PRESSES**

BENCH and FLOOR MODELS

Write for Catalog

FAMCO MACHINE COMPANY

1320 18th St.

Racine, Wis.



A New Composite Metal

A new composite metal that seems to offer great possibilities from the standpoints of wear, corrosion resistance and low production cost is reported by United Engineering & Foundry Co., Pittsburgh, Pa. They have just been granted a license for the new development by R. E. Kinkead, 3441 Lee Road, Cleveland, Ohio.

The new material is ordinary steel

with the surface alloyed by the addition of chromium and nickel. The machine which makes it possible, utilizes the Lincoln "Electronic Tornado" process of automatic carbon arc welding.

Providing increased wearing qualities at substantial cost savings, the new composite metal is tremendously significant, to the steel industry and to many fields where wear and corrosion resistance are important.

Eklind UNIVERSAL MILLING HEADS TURCHAN HYDRAULIC DUPLICATING ATTACHMENT



THE MODEL
4 H.C. EKLIND
— TURCHAN

Hydraulic Duplicating Unit shown, is designed and priced for the average range of work in die shops making Bakelite, Plastic, Rubber and Drop Forge molds and dies. Oil pressure is supplied from tank to feed quill and arm at exact rate to follow contour of model. Operators can learn quickly to duplicate within a few thousandths and save considerable over hand methods.

The "EKLIND" Milling Head is offered separately and the duplicating attachment can be added later.

Write today for circular

UNIVERSAL HIGH SPEED TOOL CO.

549 W. WASHINGTON BLVD.

CHICAGO, ILLINOIS



Air CYLINDERS and VALVES

We've been making them for our own machines for 25 years. Exclusive design...without tie-rods. More compact! Heads removable without disassembling entire unit. All cylinders cast iron, machined and honed. All diameters, lengths and mountings. Hand valves; foot pedal valves; electric operated valves and our own exclusive design automatic self-operating valves. *May we quote you on your requirements?*

The Bell Machine Co. 61 Jackson Dr., Oshkosh, Wis.

VIMCO puts the Light on the Spot

VIMCO brings the light to the job, focused right where it is needed. This light can be attached to the machine and easily adjusted.



VIMCO will gladly cooperate in solving your lighting problems. No obligation to you.

Shown is a Nibbler Machine of The Libert Machine Co., equipped with a Vimco Light.

Write today for more details.

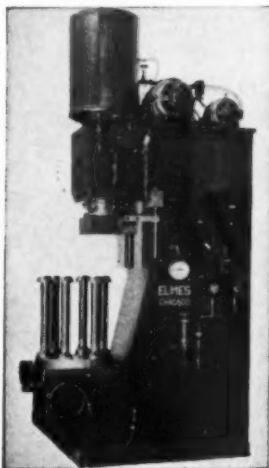
VIMCO MFG. COMPANY, Inc.

109 Channing Street,

Buffalo, New York

Elmes Metal Marking Press

A versatile new hydraulic metal marking press is announced by the Charles F. Elmes Engineering Works, Chicago. It will die stamp any marking on metal pieces of a wide range of



sizes and shapes and is said to be capable of 20 markings per minute.

The operation is fully automatic and is controlled by push buttons. There are 6 stations on the turn table. The table may be moved independently of the ram and vice versa. However, the machine is arranged so it will not stamp a blank mandrel. The pressure may be released at a pre-determined tonnage or after the die has marked the work to a specified depth.

The range of pressure is controllable from 15 to 100-tons. The machine is of all steel construction and has an overall height of approximately 11 feet. It includes motors, starters and accessories ready for operation and is modern in design and appearance.

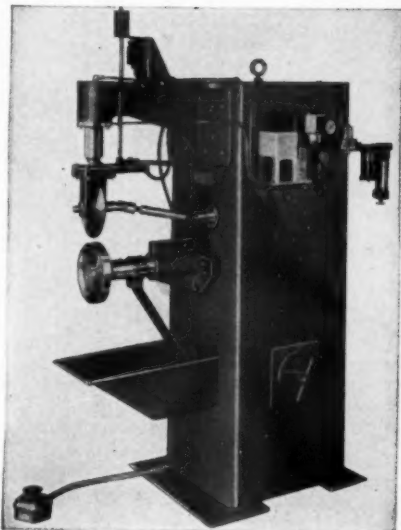
Acro Presents Seam Welders

The Acro seam welders are designed for straight or circular seam welding, or can be furnished with a universal head. Either wheel, or both wheels, can be driven by power or the knurl method. Speeds can be furnished to suit particular requirements. Current interruption may be complete electronic or mechanical.

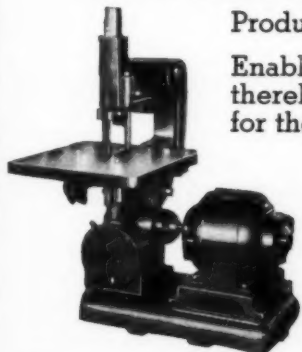
In addition to these two types of interrupters, Acro also offers an Acro electronic interrupter using water-cooled ignition tubes. The on time and the off time are easily adjusted. Cooling of the wheels is accomplished either by the use of hollow wheels or the spray method. The air control for actuating the upper wheel and starting the interrupter is fully automatic. Pressure is also adjustable.

Acro units are available in all sizes with various throat depths.

Address Acro Welder Mfg. Co.,
1570 So. First St., Milwaukee, Wis.
for full details.



Oliver Die Making Machines Will Save You Money—



Produce your rush jobs on time—

Enable you to use less skilled labor,
thereby reserving the A-1 Mechanics
for the exacting work.

*They are fast and efficient
on all sawing, filing and
lapping operations.*

Send for catalog and prices—
no obligation.

Prices as low as \$125.00.

Oliver Instrument Co., 1408 Maumee St.
Adrian, Mich.

A Turret Lathe in Miniature

A miniature Warner & Swasey turret lathe that is an exact replica in every detail of a full size machine, including turrets that actually index, a head stock with a complete range of adjustable speeds, and a miniature oil pump that actually circulates coolant liquid, stole the show when employees exhibited their hobbies at the Warner & Swasey open house last week.



The work of Paul H. Klammer, a planer department foreman who has been building models as a hobby for sev-



Drill Grinding Attachment

Fits Black & Decker and Van Dorn grinders, sharpens twist drills correctly. Price only \$18.

C. H. Carlson Mfg. Co.
13-15 Main St., N. E.
Minneapolis, Minn.

Write for
bulletin

eral years, the miniature lathe is complete in every detail. It has way covers, a square turret lock bolt with remote control, rapid traverse, adjustable turning heads on the hexagon turret, even a tiny stop roll with adjustable stop screws — and everything works. Not much more than 20 inches in overall length, the machine has gears in the apron feeds as small as 1/4-inch in diameter.

Spurred by the remembrance of some very unusual models exhibited by his fellow employees at the company's open house last year, Klammer averaged

HARD USAGE Doesn't Faze The HARTFORD MILLING VISE



Because it was designed to "take it"—and it does! It will stand up, day after day, under the heaviest, toughest strain of production milling work. Made of the best materials, with all parts interchangeable, it will outlast four or five ordinary vises. Rapid and accurate in operation—the top eccentric handle gives tremendous binding force, while the lower cam-faced handle gives instantaneous quick-opening and return. A trial in your shop will convince you better than anything we might say.

Write for Folder and Complete Details

Jaw width.....	5"	Maximum opening	3 1/4"
Jaw depth.....	1 1/4"	Weight.....	40 lbs.

Also made in the swivel-jaw type with hard or soft jaws, maximum opening 2 1/4".

HARTFORD SPECIAL MCHY. CO.
285 HOMESTEAD AVE., HARTFORD, CONN.

We also Build Machinery on a Contract Basis,
Design and Develop Special Automatic Ma-
chinery—Gears and Gears Cut to Order.



USEFUL In Any Modern Shop

This sturdy 36"x48" Milwaukee Surface Plate is of semi-steel construction, accurately machined, provided with cross ribs every 10 1/4" for rigidity, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30". Shipping weight 1100 lbs.

We also make larger and smaller plates either with planed or scraped surfaces which ever is desired.

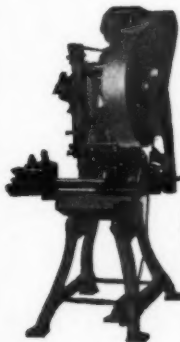
Write today for full information.

J. C. BUSCH COMPANY

E. Pittsburgh Ave. and So. Ferry St.,

ENGINEERS AND MACHINISTS
SINCE 1907

MILWAUKEE, WIS.



WITTEK AUTOMATIC ROLL FEEDS

fast, safe, accurate, automatic

For profits, economy, safety and automatic high speed punch press production, install WITTEK Automatic Roll Feeds. Can be installed on ANY MAKE OR SIZE PUNCH PRESS WITHOUT ALTERATIONS. Wittek Feeds are preferred because they combine high speed accuracy with low maintenance cost, they save dies, reduce scrap to minimum and make high speed automatic operation practical on even comparatively short runs.

WITTEK REEL STANDS

6 models—a reel stand for every job—will handle any size coiled stock. No. 3 (illustrated) has automatically expanding coil holder which provides easy loading and assures perfect balance at all positions. Wittek Reel Stands give an even, steady run of stock to the feed, insuring maximum production by eliminating looping, tangling and backlash of stock.



- WITTEK Feeds handle any coiled stock and feed either from right to left, left to right, front to back and back to front in any length from 0° to 24° per press stroke at catalog speed or faster. Single Roll without straightener and compound Types with or without straighteners. Improved and simplified method of operation does away with complicated parts and consequent break-down factors.

WITTEK MANUFACTURING CO.
4305-9 W. 24th Place, Chicago, Ill.

CUTS CLEAN

Whether it's a straight, circular or irregular job, the **BEVERLY SHEAR** gives a clean, sheared edge without knurl or distortion — and with minimum effort.

Made in two sizes, either of which may be carried in a tool box — No. 1 weighs 16½ lbs., and cuts up to 14 gauge.

No. 2 weighs 32 lbs. and cuts up to 10 gauge.



Reasonably priced—send for descriptive circular

THE BEVERLY SHEAR CO.
3807 W. 118TH PLACE, CHICAGO, ILL.

BAUMBACH



STANDARDIZED

Machined Steel

DIE SETS

Semi-Steel

Drop Forged Steel

Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 185,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Write for our new 388 Page Catalog.

E. A. BAUMBACH MFG. CO.

1810 So. Kilbourne Ave.,

CHICAGO, ILL.

4 hours a day at his self-appointed hobby assignment for some 300 days.

Klamm is pictured in the center, showing the model to Wm. J. Burger, Warner & Swasey works manager (left), and Nels Swenson, plant superintendent.

A New High in Broaches

What is believed to be one of the longest single piece hardened and ground broaches ever produced was recently delivered by Colonial Broach



Company, Detroit, to a producer of tractors. Designed for complete finishing of splines in a single pass of the broach in tractor drive bevel gears, the broach itself is over 80 inches long and approximately 5 in. in diameter. The broach is to be used on a broaching machine having a 6 ft. working stroke.

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

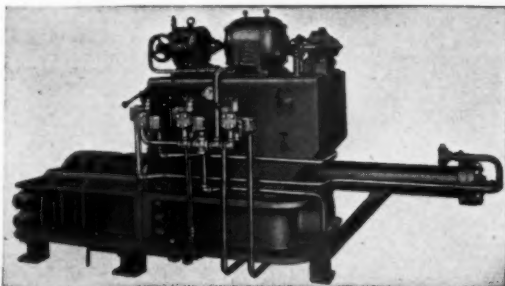
JOHN T. BURR & SON
429 Kent Ave., Brooklyn, N. Y.

High Density Baling Press

The Hydraulic Press Mfg. Co., Mount Gilead, O., announces a new baling press.

Trimmings, punchings, or similar scrap metal, are placed in the box section of the press. The sliding lid which forms the top of the box, is closed by hydraulic pressure. As soon as the lid is closed, the preliminary pressing platen moves towards the end of the box.

When this platen has reached the end of its travel, the side baling platen moves forward, compressing the scrap into the finished bale. The sliding lid is then opened, returning the first platen with it. The side platen is also returned to its initial starting position. The finished bale of exceptionally high density is then ejected from the box by a pneumatically operated ejector locat-



ed underneath the box.

The baler requires a minimum of space. There are no outside hydraulic pressure lines to be connected. The press is complete with electric motor and hydraulic pumps. To put the machine in operation, it is only necessary to connect electricity for motor, compressed air for ejector, and water for cooling the operating oil.



**STYLE 10-B GRAND RAPIDS
COMBINATION TAP & DRILL GRINDER
SHARPENS TAPS FROM No. 6 TO 1½"
TWIST DRILLS FROM ¼ to 1½".**

BULLETIN ON REQUEST

Gallmeyer & Livingston Co.

405 STRAIGHT AVE., S. W. GRAND RAPIDS, MICH.

Standard Since 1911



**INCLINABLE
POWER
PRESSES**

LOSHBOUGH-JORDAN

TOOL & MACHINE CO.

1625 STERLING AVE

ELKHART, INDIANA

Lincoln Presents New Engine-Driven Welder

A new 200-ampere engine-driven arc welder of light weight, small size, and low cost for an engine-driven unit of its capacity, is announced by The Lincoln Electric Co., Cleveland.

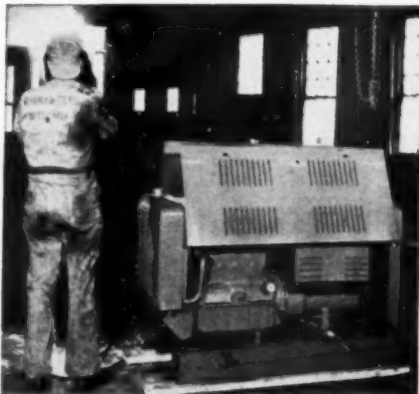
Designated as the "SAE-200 J" the welder is of the Junior type. It is light enough to be wheeled readily by one man, or lifted easily on its single balancing hook by average moderate-capacity chain or crane falls. The weight is under 900 pounds.

Ease of moving and handling are further enhanced by its size which also shows to advantage in the matter of floor space. Dimensions of the stationary model, are:—length, over radiator grille 56", over hand crank 63 $\frac{3}{8}$ "; width 20 $\frac{1}{4}$ "; height 37 $\frac{1}{4}$ ". The portable model (shop type) is of the same length as the stationary type and 27 $\frac{1}{2}$ " wide (wheel clearance) by 44 $\frac{1}{2}$ " high. Floor space required for the stationary model is only 8 square feet.

Requirements for a wide range of applications for direct current arc welding are met, such as light-gauge metal by the metallic arc process; also car fenders, bodies, and galvanized sheet by the carbon arc method; repairs to cast iron parts such as cylinder heads and blocks; fabricating a wide variety of equipment; hard facing; etc. It produces uniform current for

speedy welding of practically all metals and alloys with either bare or shielded arc type electrodes.

Generator is of the Single-operator,



variable-voltage type with laminated pole pieces, increasing arc stability and simplifying welding. Current range, welding duty, is 40 amperes of 250 amperes for either bare, washed, or heavily coated electrode. At the lower part of its range, it delivers a current of light penetration characteristics for welding extremely light-gauge materials. At the upper portion, it delivers ample current for the speedy welding of plates angles, and other relatively heavy joints.

Class B insulation, used in the arma-



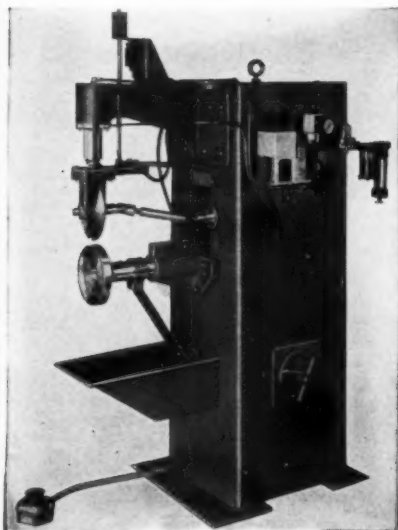
GEARS IN STOCK— IMMEDIATE DELIVERY

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on gears of any kind. Send us your blue prints and inquiries.

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The ACRO SEAM WELDERS

are designed for straight or circular seam welding, or can be furnished with a universal head. Either wheel or both wheels, can be driven. Equipped with full Electronic Control or mechanical interrupter. Speed either fixed or variable.

Send for information on our complete line of ACRO WELDERS.

Acro Welder Mfg. Co.
1570 So. First St., Milwaukee, Wis.

Four Steps to Quality

THREADWELLS ARE-

1. Accurately Manufactured
2. Absolutely Dependable
3. Carefully Selected
4. Skilfully Heat Treated

WRITE TODAY FOR
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**THREADWELL
TAP & DIE CO.**
GREENFIELD, MASS.

STANDARD PROTECTION against Breakdowns

UNBRAKO

SELF-LOCKING

Hollow Set Screws WITH THE KNURLED POINTS

Accidents and breakdowns caused by ordinary set screws working loose just can't happen when your machines are equipped with "Unbrako" Self-Lockers. Once set up they stay absolutely tight . . . not a chance for them to vibrate loose which means far less maintenance work in the bargain. These screws can easily be set up or removed with the ordinary hex bar wrench and re-used indefinitely, always with the same effectiveness. Write us today for samples, prices and details.



Fig. 1645
Pat's. Pend'g

**STANDARD
PRESSED STEEL CO.**
JENKINTOWN, PENNA.

Boston
Detroit
Indianapolis

Box 559

Chicago
St. Louis
San Francisco

ture, contains no inflammable materials whatsoever. The coils, wound with glass-covered wire, are held in mica-lined slots, separated by mica dividers, and the leads are connected into the commutator by special, high-melting point solder.

Continuous voltage control, (job selector), and current control make it easy to select any type of arc and any arc intensity to suit the job. Controls are self-indicating. Change of welding current polarity is easily accomplished by switching electrode and current cable connections, which are held by wing-nut terminals on front of welder base.

The four-cylinder engine has 3-inch bore and 4-inch stroke with piston displacement of 113 cubic inches, delivering 26 h.p. at 1800 rpm., the speed at which the unit is operated. Fuel tank capacity is 8-gallons, enough for about one day normal operation.

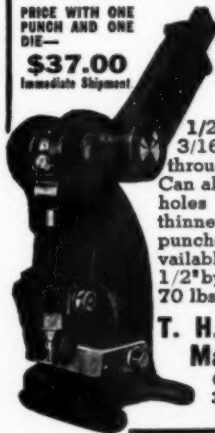
T. H. L. FRONT LEVER BENCH PUNCH

Built for hard, tough work — die can-

PRICE WITH ONE
PUNCH AND ONE
DIE—

\$37.00
Immediate Shipment

not lose alignment with punch — all parts interchangeable.



Capacity —
1/2" holes through
3/16" steel; 13/32"
through 1/4" steel.
Can also be made for
holes up to 7/8" in
thinner metal. Stock
punches and dies a-
vailable from 1/16 to
1/2" by 64ths. Weight,
70 lbs.

**T. H. Lewthwaite
Machine Co.**

(Est. 1890)

311 E. 47th St.,
NEW YORK

Fafnir Develops Corrosion-Resistant Treatment

The Fafnir Bearing Co., New Britain, Conn., announces a process whereby exposed parts of ball bearing transmission units are being chemically treated to resist corrosion, without change in their physical properties or dimensions.

The process involves the formation of an oxide-layer which penetrates .0002" to .0003" into the surface of the metal, without changing its external dimensions. It is said that this protective layer, really a part of the metal itself, does not chip or peel, and is unaffected by temperature. The treatment is readily recognizable by the distinctive jet-black finish it imparts to the metal.

MARKED - IDENTIFIED

Permanently



MODEL 25

PART NUMBERS, CATALOG NUMBERS,
HEAT NUMBERS, SERIAL NUMBERS,
PATENT NUMBERS
MANUFACTURER-INSTRUCTION DATA-INSPECTION

Positive, Permanent MARKING ON YOUR PRODUCTS ASSIST PROSPECTS TO ORDER. MAKES IT EASIER TO BUY—NEW, REPEATS AND REPAIRS. GIVES YOU A DEFINITE RECORD OF PERTINENT DATA ON EACH PART PRODUCED.

The Pneumatic Marking Machine ILLUSTRATED IS OUR HI-DUTY MODEL 25 GENERAL PURPOSE TOOL FOR SHORT RUNS OR PRODUCTION WORK. IT OPERATES FROM YOUR SHOP AIR LINE AND IS ONE OF NUMEROUS MODELS BUILT TO PRODUCE NEAT, PERMANENT MARKINGS QUICKLY ON METAL FABRICATIONS.

WE WILL BE HAPPY TO MAKE SPECIFIC RECOMMENDATIONS UPON RECEIPT OF SAMPLES OR PRINTS OF PARTS TO BE MARKED, SHOWING APPROXIMATE LETTERING, ITS LOCATION ON THE PART, WITH REQUIRED HOURLY PRODUCTION.

MARKED PARTS ADVERTISE
IN THE RIGHT PLACE, AT THE RIGHT TIME.

Unlike John Alden —
"They Speak For Themselves."

GEO. T. SCHMIDT, Inc.

1802 Belle Plaine Ave., Chicago, Ill.
Builders of Marking Equipment Since 1895.

Send for complete catalog of our full line of marking Tools, Machinery and Equipment.

Rotor Tool Releases New Models

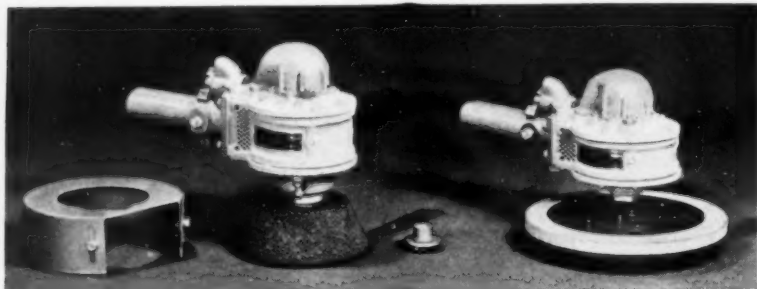
The Rotor Tool Co., 17325 Euclid Ave., Cleveland, announces two new vertical types of Air Grinders, the B-1X and the B-3X for which the following features are claimed:

Power of both models has been increased over 40% compared to preceding types.

Maximum power is developed with less than 10% drop in the free speed, which gives high load speed for fast cutting action of the grinding wheel or sanding disc.

Light weights—the B-1X weighs 10 lbs., the B-3X 12½ lbs.

The new Rotor governor, M-8001, is a new balanced multiport governor which controls the maximum speed within the limits of the Safety Code by



The "Butterfly" Filing and Die Making Machine

Reg. U. S.
Pat. Off.



Constructed as per specifications of United States Naval Aircraft Factories.

Beware of Imitations!
Our machine carries the Butterfly trade mark.

NEW MODELS D. & E. L.

The "Butterfly" owes its ever increasing popularity to its high standard of efficiency. It is the quietest machine of its kind and is well adapted to highly accurate work. It is being used by the leading manufacturers of the United States and Europe and also by the United States Government.

Write for folder
D. and E. L.

HARVEY
MANUFACTURING CORP.
161 Grand St., New York, N. Y.

compressed spring action which is not affected by variation in air pressure.

Low maintenance — the external blade type motor requires only two blades and when necessary to check blades to bring tool back to original power it is merely necessary to remove the cover plates without disassembly of the entire tool.

The tools are used for grinding with 6"x4"x5/8" cup wheels for welds, castings, etc.

Used with a 9" flexible pad, they are recommended for disc sanding or with 6" cup brushes for wire brushing.

The manufacturers claim that the tools are exceptionally well balanced, with the two handles 90° apart for easy control, and that the large area of contact of the cutting accessories ensures rapid production combined with ease of operation.

In addition to metal work, grinding, disc sanding, wire brushing, etc., these machines are widely used for the rapid surfacing of hard stone, such as marble, granite or concrete, equipped with a special stone wheel operated dry at 5000 r. p. m.

Lincoln Industrial Progress Award

A 2½ year program of scientific study, culminating in the payment of 453 awards, totaling \$200,000 is announced by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

The awards are established for studies bringing out the benefits of a social, economic or commercial nature, such as reduction or elimination of hazards to safety and health; greater availability of comforts and conveniences through reduced prices; greater utility and durability of machines and structures, as well as industrial benefits such as cost savings and other advantages in manufacture, fabrication or construction.

Studies will cover the automotive, aircraft, railroad, watercraft, structural, furniture and fixture, commercial welding, welderies, functional machinery, industrial machinery and maintenance fields.

The grand award will be \$13,700 for the best progress report submitted.

Main program awards will be \$10,000, \$7500 and \$5000, and there will be numerous classifications, divisional and honorable mention awards well worth winning.

Authors of the studies may be engineers, designers, architects, draftsmen, plant superintendents, produc-

tion managers, foremen, owners or operators of fabricating or repair shops. One author or a group may submit a study.

Participants have until June 1, 1942 to pursue their studies and prepare reports summarizing them.

All inquiries concerning the award program should be addressed to the Secretary, The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

A New Line . . .

the **500** Series **ROTARY GEARED PUMPS**

with HERRINGBONE GEARS



—Quiet in operation
... for pressures up to 500 lbs.

Ask for circular

Brown & Sharpe Mfg. Co.,
Providence, R. I., U. S. A.

BROWN & SHARPE
PUMPS

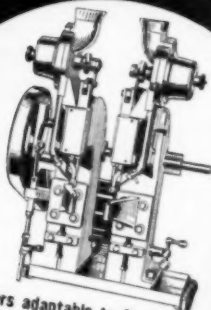


AUTOMATIC RIVET SETTER

For radios, switches,
toys, electric parts
and appliances, auto
parts and accesso-
ries, and other small
assemblies.

WITH
Adjustable
CENTERS

Sets 1 or 2
rivets at a time



Centers adaptable to 6". For set-
ting rivets up to $\frac{1}{4}$ " body diam-
eter. Bench and pedestal types.

Will give you vol-
ume production
savings even on
short assem-
bly runs. Less
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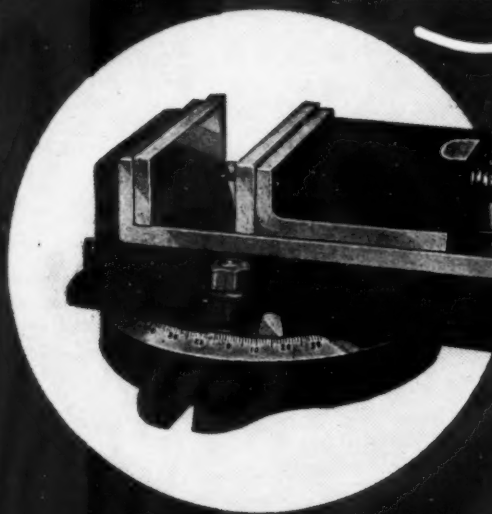
No obligation for assembly
analysis. Send sample or
blueprint with inquiry.

CHICAGO RIVET & MACHINE COMPANY

TUBULAR AND SPLIT RIVETS IN ALL RIVET METALS

1855 SO. 54th AVE. (Cicero P. O.) CHICAGO, ILLINOIS

Swivel MILLING MACHINE Vises



Also Mfr's of
Magnetic Chucks
Demagnetisers
Lathe Chucks
Power Hack Saws
Dividing Heads

**85 LB.
MASTER**

**HEAVY DUTY
6½" SIZE**

\$27.00

Suitable for milling machines, drill presses, shapers, etc., these large semi-steel vises may be used plain or swivel. The steel jaws are sturdy. Key slots provide for attachment to machine table holding surface, with jaws at right angle or parallel to table. Junior 4½" size, 45 pounds, **\$19.50**

L-W CHUCK CO

1-7 N. St. Clair St.,

Toledo, Ohio

CHICAGO MOUNTED WHEELS OF V/T SUPER

150% LONGER LIFE

Chicago Mounted Wheels made of the new V/T Super Bond prove by tests conducted in many plants on snagging and exacting operations to have from 150% to 300% longer life. They're tougher; can take more punishment; grind more pieces per wheel, faster and without sacrifice of cutting action.

V/T Super Bond holds its original shape longer. Wheel will not ridge or grinding welds, sharp corners, sinking dies, barbering, and other work of this character.

V/T Super Bond meets the challenge of today's exacting requirements. Cut your grinding cost. Let us prove it to you in your own plant on your toughest mounted wheel job.

Let us send you one of these Mounted Wheels without cost or obligation. Tell us the kind of job, type of equipment and size you want to use to make your own test.

Complete Catalog Free upon Request.

FREE MOUNTED WHEEL CHART

Ideal for ready reference in the shop. A Wall Chart 22x15", showing actual size and shape of every standard Chicago Mounted Wheel.

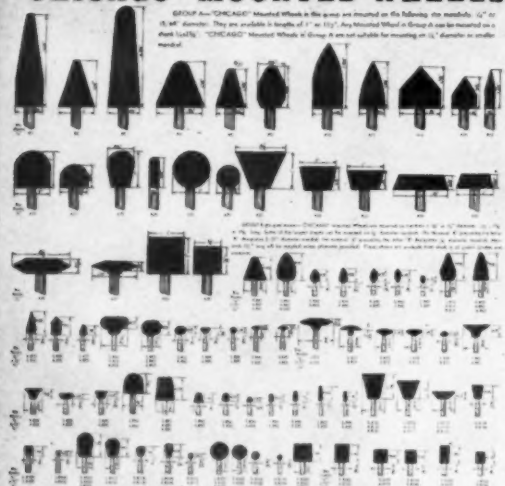
CHICAGO WHEEL

Makers of Quality Products

1101 W. Monroe St.,

Canadian Distributors: Canadian Trade Corp., Ltd.

"CHICAGO" MOUNTED WHEELS



GROUP A—STANDARD, PLAIN MOUNTED WHEELS

GROUP B—STANDARD, PLAIN MOUNTED WHEELS

GROUP C—STANDARD, PLAIN MOUNTED WHEELS

GROUP D—STANDARD, PLAIN MOUNTED WHEELS

GROUP E—STANDARD, PLAIN MOUNTED WHEELS

GROUP F—STANDARD, PLAIN MOUNTED WHEELS

GROUP G—STANDARD, PLAIN MOUNTED WHEELS

GROUP H—STANDARD, PLAIN MOUNTED WHEELS

GROUP I—STANDARD, PLAIN MOUNTED WHEELS

GROUP J—STANDARD, PLAIN MOUNTED WHEELS

GROUP K—STANDARD, PLAIN MOUNTED WHEELS

GROUP L—STANDARD, PLAIN MOUNTED WHEELS

GROUP M—STANDARD, PLAIN MOUNTED WHEELS

GROUP N—STANDARD, PLAIN MOUNTED WHEELS

GROUP O—STANDARD, PLAIN MOUNTED WHEELS

GROUP P—STANDARD, PLAIN MOUNTED WHEELS

GROUP Q—STANDARD, PLAIN MOUNTED WHEELS

GROUP R—STANDARD, PLAIN MOUNTED WHEELS

GROUP S—STANDARD, PLAIN MOUNTED WHEELS

GROUP T—STANDARD, PLAIN MOUNTED WHEELS

GROUP U—STANDARD, PLAIN MOUNTED WHEELS

GROUP V—STANDARD, PLAIN MOUNTED WHEELS

GROUP W—STANDARD, PLAIN MOUNTED WHEELS

GROUP X—STANDARD, PLAIN MOUNTED WHEELS

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GROUP Z—STANDARD, PLAIN MOUNTED WHEELS



CHICAGO WHEEL & MFG. CO.

PER BOND

GREATEST FORWARD STEP IN 30 YEARS

V/T Super Bond is one of the most important developments in mounted wheels. Wherever the use of a tough, hard bond that will stand the gaff is required, V/T Super Bond will be found without peer. Nothing can compare with it in endurance, stamina and performance. There is a shape and size to handle every grinding job faster, better and at lower cost.

Chicago Mounted Wheels

- ✓ The FIRST small abrasive wheels mounted on steel mandrels to be offered to industry.
- ✓ The FIRST with this special new and exclusive bond - V T Super Bond, unequalled in strength and long life.



HANDEE TOOL OF 1001 USES

Here's a small "power house" that can be carried to any part of the shop and used wherever there is an electric outlet. Repairs hard-to-get-at parts on machinery without removing the part—smooths off rough spots on dies and moulds—cleans delicate mechanisms—grinds, drills, polishes, cuts, routs, carves, sands, saws, sharpens, engraves, cleans, etc. Uses 300 accessories. There are more Handees in use today than all other tools of this type combined.

De Luxe model weighs 12 oz. 25,000 r.p.m. \$18.50 postpaid with 6 Accessories.

TRY A HANDEE FOR 10 DAYS IN YOUR OWN PLANT



ENT & MFG. CO.

Products for 40 Years

Chgo. HB, Chicago, Ill.

1332 Williams St., Montreal

- ☐ Send Free Wheel. Size _____
- ☐ Free Wall Chart
- ☐ Catalog of Handee Products and Grinding Wheels.
- ☐ De Luxe Handee on 10-Days Trial.

Name _____

Address _____

START THE

SUN

MON

TUE

WED

THU

FRI

SAT

New Year

OUT RIGHT



Don't begin the NEW YEAR with the worn-out tools of the old year. They may be good enough for old Father Time, but they can't compete with modern competition.

Take inventory of your tools now.

Do your cutters, drills, reamers, files and end mills need re-cutting?

Are your pneumatic tools worn and in need of being rebuilt to original size?

Do you want longer life imparted to your machine parts and dies?

Are you in need of good pneumatic tools?

If you can answer Yes to any, or all of these questions, then it will pay you to send for literature on Tool Salvage, Hard Chrome Plating and Master Chipping Hammers.

Do It Today

**EASTERN CUTTER
SALVAGE CORP.**

Newark, New Jersey

**MASTER TOOL
CO., INC.**

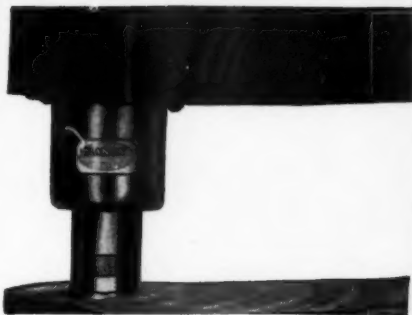
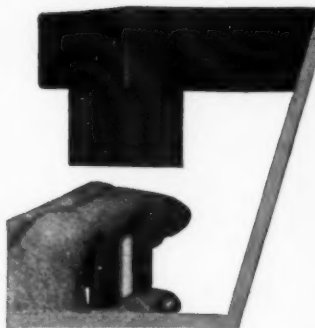
Cleveland, Ohio

**THE MASTER
CHROME SERVICE, INC.**

Cleveland, Ohio

DANGER AHEAD

Safe



with Danly Safety Guide Post Covers

Most press accidents today are pure accidents; and in cases where the bushing leaves the guide post, the resulting gap is a source of danger.

Some worker places a hand or arm between the bushing and the post, when the press is down or power is off. When the press is started, serious injury results. Also carelessness or slips in handling get the stock between guide post and bushing, resulting in a "wreck" of die, die set or press—piling up expense and crippling production.

These "didn't know it was loaded" types of accidents are the most difficult to prevent—but Danly Safety Guide Post Covers applied to all dies where the bushing leaves the post are a low cost way of providing automatic insurance against them. They cover the gap so that nothing can enter; and they can also be equipped with oilers for positive lubrication.

A new folder "Danger Ahead" fully describes Danly Safety Guide Post Covers and their uses. Send for your copy today.

DANLY MACHINE SPECIALTIES, Inc. • 2112 So. 52nd Ave., Chicago, Ill.

**DANLY DIE SETS AND
DIE MAKERS' SUPPLIES
FROM THE 9 DANLY
BRANCH STOCKS**

LONG ISLAND CITY, N. Y.
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Metals and Supply Co.
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DANLY

DIE SETS and DIE MAKERS' SUPPLIES

AT YOUR COMMAND



4 SPEEDS

Shaper operation is made more flexible — more efficient with a SCHULTES Four Speed Drive—with just the right speed for the job—at Your Finger-Tip.

The modern drives are equally valuable for lathes, milling machines, drills or punch presses. They're low in first cost and easily attached. Soon repay their cost through savings which they make possible.

Schultes Drives incorporate all the latest engineering improvements and advantages. They're dependable, economical to operate and maintain, and will show definite savings in production costs.

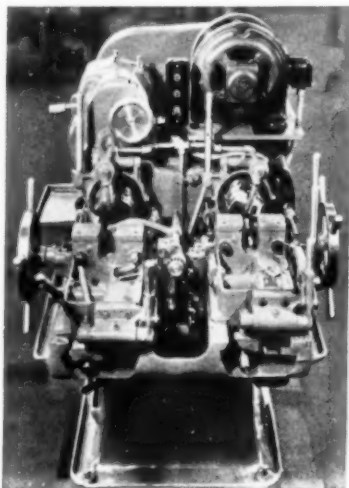
*Write for bulletin
giving complete information*

Westlof Tool & Die Co.
428 Bellevue Ave., Detroit

Landis $\frac{7}{8}$ " Turning Machine

Here is a $\frac{7}{8}$ " double head machine, recently equipped by Landis Machine Co., Waynesboro, Penna., for a combination pointing, beveling, turning and facing operation.

The machine is a standard Landis $\frac{7}{8}$ " double head threading machine equipped with leadscrews and with $\frac{7}{8}$ " hardened and ground heads. Several fixtures are added for this special turning operation.



These include the milling cutters, which replace the usual chasers; a spring actuated tool holder to carry the pointing and beveling tool (two of these special tools are shown on the right hand carriage), and the automatic work stop for positioning the work in the vises.

Special milling cutters can be used for reducing the body diameters of long length bolts; or cutters for a combination turning and shoulder facing operation can be substituted for the regular milling cutters.

The pointing and beveling tools are carried in a holder extending entirely



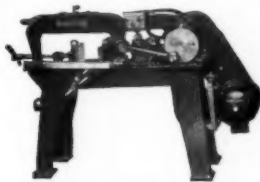
**No. W-3B-Wet Cut, high speed 6"x6"
motor drive**

Fast, Smooth Action—Hydraulic Feed and control—2 speeds standard.

"Standard The World Over"

RACINE

The new, fast cutting, Racine Utility saws—Hydraulic Feed-Dry Cutting or Wet Cutting—Write for remarkably low prices—Also a full line of heavy duty machines up to 14x20" capacity.



No. D-3B Dry Cut 6"x6"

RACINE TOOL & MACHINE COMPANY

1754 STATE ST.

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RACINE, WIS. U. S. A.

DYER SPOT WELDERS

from

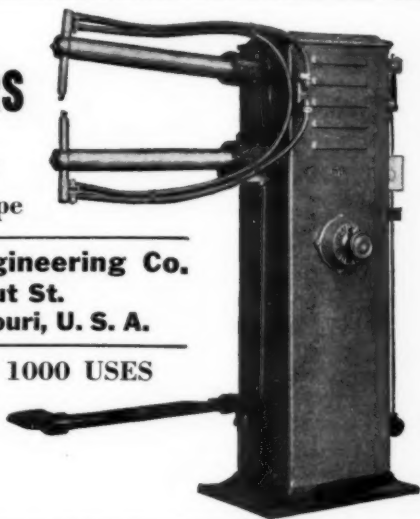
2½ KW to 35 KW
Bench and Floor Type

Dyer Welder & Engineering Co.
2727 Walnut St.
Kansas City, Missouri, U. S. A.

THE WELDER OF 1000 USES

For Sheet Metal
and

Wire Products



through the spindle. This can be adjusted, at rear of spindle, to permit the turning, pointing, and beveling of work for the length of 5".

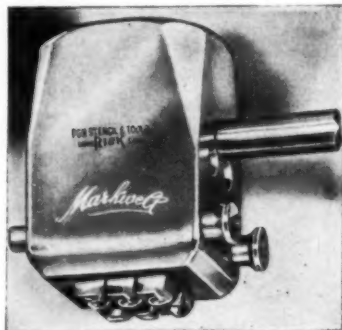
Turning operations on a machine of this type are said to offer increased production possibilities as well as accuracy. The four milling cutters operating in a single plane about the axis of the work assure a uniform cutting action that produces a perfectly round turning job. The machine can also be used for threading if desired.

Marking Hot Metals

The Pittsburgh Stencil and Tool Co., 713 Crafts Bldg., Pittsburgh, Pa., manufacturers of Rick Markwell Holders for stamping steel and other products, announces a new tandem holder which is particularly valuable for stamping intensely hot metals.

The only moving part is a sturdy pin, in each row of type, which carries its own spring. One quick motion locks it; another unlocks it.

Markwell holders, which handle type made for other holders as well as its



own, employ safaloy type, a special alloy, which is said to be practically unbreakable. Markwell holders come in all sizes from $\frac{1}{8}$ " type up to 1" or larger.

The manufacturer will be glad to mail copies on request.



Cutter shown is a 5 in. diam., ten blade, McCroskey Jack-Lock Milling Cutter made by the McCroskey Tool Corp., Meadville, Pa.

MACHINES 15 TO 30 TIMES MORE PIECES IN 1/6 THE TIME PER PIECE

TYPE OF BLADE	PIECES PER GRIND	MILL. TIME PER PIECE
KENNAMETAL Tipped	300	Less than $\frac{1}{2}$ min.
High Speed Steel	10 to 20	3 minutes

The above tests were made on scaly, sandy, hard cast steel, yet there was no breakage of the KENNA-METAL-tipped blades. Results shown in the table are typical of the increased production made possible by KENNAMETAL.

Write for complete information today.



● DON'T DISCARD IT

Effect a 30% to 75% saving in tool costs, by having your worn-out or obsolete tools made over by RENU — and guaranteed as good as new, both for appearance and performance.

Renú Tool Co.,
375 E. Milwaukee Ave.
DETROIT, MICHIGAN

Renú IT!

St. Clair Handles Tantung in East

"Strengthening Designs for Cemented Carbide Tools" was the title of a lead article by Leo J. St. Clair in the October issue of The BLUE BOOK.

Mr. St. Clair is President of the recently formed General Tool & Die Corp., 62 Franklin St., East Orange, N. J. He announces that his Company will handle distribution of Fansteel's new hard facing material "Tantung" in the States of North Carolina, Maryland, Delaware, Pennsylvania, New York, New Jersey and all of New England.

Mr. St. Clair summarizes the advantages of this material as follows:

1 — It is as hard as hardened steel.

2 — Wear resistance is said to be from five to 20 times that of hardened steel.

3 — Hardness is retained at high temperatures.

4 — High acid and corrosion resistance.

5 — Low coefficient of friction.

6 — Thermal conductivity is extremely low.

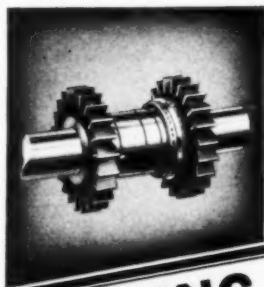
It is recommended for long knives, centerless grinder blades, grinder centers, cutting edges on knives and instruments. It is very tough and can be used on shaper and planer tools for interrupted cuts, etc.

It is easily applied to iron or steel parts, by melting the Tantung with a highly carbonized acety-

lene flame, preheating the part to which it is to be applied. Properly applied, the Tantung is free from blow holes and a keen cutting edge can be produced by grinding.

Mr. St. Clair's Company will market Ramet Carbide in the form of tools. Also Rexalloy solid and tipped tools.

Stephen Carmody is Vice President of the new Company. Arthur E. Engler is Secretary. All have had long experience in the carbide industry.



**FOR ALL MAKES
OF MACHINES**

**Adjustable
and Solid**

SPACING COLLARS



Adjustable Spacing Collars

For straddle milling, gang milling and multiple slotting set-ups. They eliminate the use of shims.

Solid Spacing Collars

Are standard .001" to 3" thick. Less than 1/8" are not hardened.



**SCULLY-JONES
and COMPANY**

1905 S. Rockwell St.,
CHICAGO, ILLINOIS

OTC System Simplifies Pulling Jobs

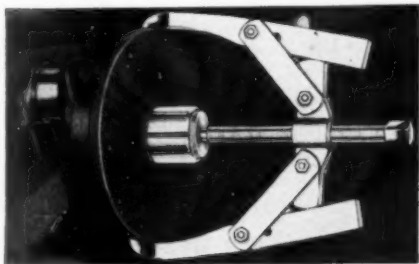
OTC Gripomatic Pullers offer an easy, safe, quick way to remove and replace gears, bearings, wheels, pinions, ball races, shafts, pulleys, etc.

The OTC patented gripping feature is claimed to prevent the jaws from slipping off the work. The jaws are thin to allow working in close quarters, and no adjustments or extra equipment are needed to hold them in place.

Six standard sizes in the line cover a wide range of work. Special pullers can be designed to meet special requirements. The sizes covered by these pullers range from 0" to 18" with pulling capacities of from 12,900 pounds to 80,000 pounds.

Illustration shows the No. 1003 puller removing a main bearing from an engine such as used in industrial units.

Other types of pullers are also available which also have the ability to re-



place gears and bearings as well as remove them.

A special service bulletin containing time-saving instructions for many pulling operations will be mailed on request to Owatonna Tool Co., 355 Cedar St., Owatonna, Minn.

DESMOND GRINDING WHEEL DRESSERS & CUTTERS



We manufacture the only complete line of Dressers and Cutters. Write for catalog and name of your nearest dealer.

DESMOND-STEPHAN MFG. CO.

URBANA, OHIO

Canadian D. S. Mfg. Co., Ltd.
Hamilton, Ont.

BUY THIS GENUINE

1/2" SpeedWay Drill

and get these features
AT THE LOWEST PRICE EVER MADE ON
A QUALITY DRILL OF THIS SIZE

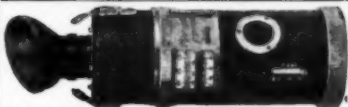
High torque SpeedWay Drill Motor
Streamlined Air-Cooled Die-Cast Case;
Direct Thrust Breast Plate Handle;
Removable side handle for close
quarters; Self Aligning Oilless Bearings;
500 R. P. M. Operating Speed
Smooth Sliding Thumb Switch.

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dealer location.

SpeedWay Manufacturing Co.
1822 S. 52nd Ave., Cicero, Ill.



PYRO THE SIMPLIFIED OPTICAL PYROMETER



Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

THE PYROMETER INSTRUMENT CO.
102-105 Lafayette St., New York, N. Y.

Business Outlook

A satisfactory first quarter for business in general throughout the U. S., was forecast by salesmen of The Warner & Swasey Co., at a recent conference.

The 21 salesmen whose territories embrace the whole country were asked: — "What is the outlook for business in general in your territory for the first quarter of 1940?"

Sixteen answered "good" and said "fair". Not one thought business in his territory would be poor.

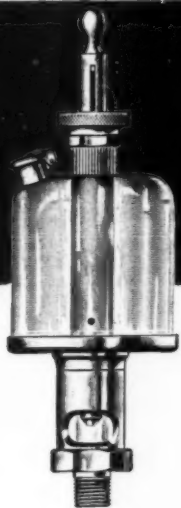
Defining "producers' goods" as equipment, machinery, materials, etc., bought by Companies, and "consumers' goods" as merchandise, household devices, cars, etc., the men were quizzed on these lines. Seventeen rated producers goods prospects as "good" and four said they were "fair." Eleven rated consumers goods industries as "good" and ten said "fair." Opinions as to retail trade tallied ten "good" and eleven "fair."

Every one of the 21 believed that today's business reflects actual demand and consumption rather than inventory buildup. The only exception was in brass and copper products, chiefly for plumbing and building, where a Winter build-up is natural in expectation of Spring and Summer activity.

While it was noted that some manufacturers had covered future require-

OIL when
and as you
need it!

GITS
unbreakable
SIGHT GRAVITY
NEEDLE VALVE
ADJUSTMENT
FEED OILER



Oil flow may be adjusted as desired, or completely shut off by adjustable needle valve. Modern, streamline, unbreakable bottle eliminates danger of broken glass in production.

Complete details on request.

GITS BROS. MFG. CO.

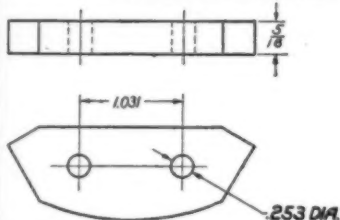
29 years of oil cup experience

ments, based on anticipated business, the general opinion was that barring an unexpected or sudden falling-off in business, manufacturers would not have unwanted inventory.

Charles J. Stilwell, President, points out that while these are personal opinions, they are reasonably authentic because the salesmen are in daily contact with a wide range of manufacturing interests, and the machine tool requirements of these Companies reflect the nature and extent of the business being done now, and in prospect. Most of the business is for the peace time needs of our people.



**don't drill
small holes**



This cam, made of 5/16" thick 1020 material, is being blanked and pierced with two .253" holes in a compound die, through the use of DURABLE Patent Piercing Punches with Intermeshing Sleeves, and the user reports runs as high as 40,000 pieces without punch breakage. The holes are straight without draft and ready for use. Formerly the pieces were blanked, drilled and reamed.

Over 80% of our customers have expressed satisfaction with repeat orders to be used on other than their original applications.

Write TODAY for free handbook showing construction and presenting many typical dies used by industrial leaders.

DURABLE PUNCH & DIE CO.
2224 W. Grand Ave., Chicago, Ill

Greenerd Announces New 10 Ton Press

Heavier and more rugged construction distinguishes the new 10 ton completely self-contained hydraulic press developed by Greenerd Arbor Press Co., 141 Crown St., Nashua, N. H. In it, the makers have tried to build a high speed machine with as little deflection as possible.

It can be equipped with a 10 h.p. motor to give a constant speed of the ram under the full 10 tons pressure of 208" per minute, with a return speed of 280" per minute.

Or it can be equipped with a 5 h. p. motor to give a constant speed of 88" per minute. Another alternative involves the use of a 5 h.p. motor and double pump, giving a rapid traverse up to 4 tons pressure at the rate of 222" per minute, with working speed from 4 to 10 tons at the rate of 88" per minute.

Thus, use of the same frame with different hydraulic and motor equipment provides five different models—some with high speed and others with double pump which will give a rapid traverse up to four tons pressure and change over to slower working speed for higher pressures, making a high speed press with lower HP input.

Pressures can be predeterminedly set on any of the combinations.

All machines have foot control with power stops for the ram. Ram is put into motion by pressure on pedal, and pressure will remain on work until pressure is released, which automatically returns ram to power stop, and this may be set at any desired point within the 16-inch ram stroke.



Ross Air Control Valve for Heavy Duty

A new, heavy duty air control valve is announced by Ross Operating Valve Co., 6480 Epworth Blvd., Detroit. The manufacturer says that like all other Ross valves, this also is a poppet type valve with the mounting flange, the uprights, lever and other parts engineered much heavier than the standard valves. Special alloy lever and



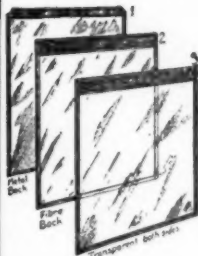
rocker arm pins of increased diameter, fitted with needle type roller bearings, larger stuffing boxes, stainless steel poppet stems and retainers, and other features provide this new valve with extra strength and wear, far beyond what actual usage really demands.

Mounting dimensions, pipe connection locations and bolt holes in this new valve remain the same as in the standard type Ross valves, which design permits mounting the valves on a bracket, a desirable feature which allows for quick, easy replacement should servicing become necessary. Plants where equipment of this type gets extremely rough usage are showing a keen interest in this new valve and have already placed advance orders.

Desmond-Stephan Production Vises

This new Simplex vise is designed to save time on production filing, fitting

Protect Shop Orders, Drawings, Blueprints...



with
WADE
Shop
Envelopes

Any size or style to order, stiff or flexible, to suit your requirements.

Send for folder and quotation.

WADE INSTRUMENT CO.
1422 E. 109th St., Cleveland, O.

or assembly work. Raising or lowering the vise handle instantly opens or closes the vise. A cam in the slide gives a $\frac{1}{4}$ " throw to enable work to



be inserted or removed. In setting the vise for the job, the handle is raised and then the knurled knob is turned until the jaw opening is $\frac{1}{4}$ " more than the width of the piece.

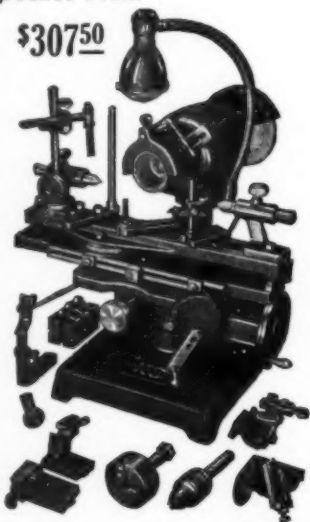
Three sizes are available each, in the stationary base and swivel base types.

Address The Desmond-Stephan Mfg. Co., Urbana, O., for bulletins giving full information.

Reamer and Cutter Grinder

Here is one machine that is still within the range of your pocket book.

\$307⁵⁰



Outstanding! Why?

At the astonishingly low price of \$307.50 you can buy this Universal Tool that will do any kind of a tool sharpening job encountered in the average shop such as milling cutters, reamers, taps, end mills, metal slitting saws, carbide bits, etc. And what is most important of all, you can do the work in approximately one half the time required on large machines costing from 3 to 5 times as much. Even if you have a Universal cutter grinder now, you cannot afford to tie up a big expensive machine for the average small sharpening job.

This machine is so simple and easy to operate, and involves such a nominal investment, that it is economical to install one in each tool crib instead of routing all sharpening jobs to one main tool room.

The K-O Grinder can be used to advantage in many manufacturing operations. It is easy to attach special holding fixtures. The machine can be purchased without attachments if desired. Ask for bulletin RG-39-H.

K. O. LEE & SON CO.

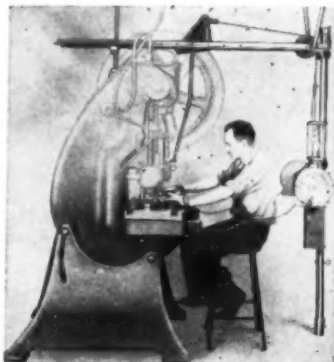
Aberdeen, So. Dak.

"practical tools for practical men"

KNOCK-OUT

Preventing Punch Press Accidents

The Universal Punch Press Guard was designed to prevent accidents in plants using punch presses, where



hand-fed operations are necessary. It is simple in construction and positive in action, and makes it impossible for the operator to keep his hands on the die when the ram is descending. Intended primarily for presses, it can be applied to almost any type of ram action machines including spot welders.

Reducing insurance costs through improvement of accident records, Universal Guards are also asserted to help increase production. Operators can speed-up the work with assurance of safety.

The illustration shows an upright press application. All Guards are equipped with brackets making it possible to tilt the press as desired. A special hinge construction permits swinging the device up out of the way for the installation of dies, and permitting the press to be used for blanking operations without the necessity of disconnecting the Guard from the press.

Address Grand Haven Stamped Products Co., Grand Haven, Mich., for a bulletin giving full details.

Johansson Gage Sales Up

Sales of Johansson gage blocks during October and November reached the highest point since May 1929, it was said today by the Johansson Division, Ford Motor Co. Enabling quick and accurate measurements to be taken in millionths of an inch, the gages are the backbone of production methods in a great variety of industries. A universal standard of measurement, the gages insure that parts made to the same specifications by factories in widely separated parts

of the world will be interchangeable, a necessity in modern mass-production processes.

Coincident with the report on recent sales activity, the Johansson Division announced the addition of chromium-plated gage blocks to the present line. The plating process provides a hardened surface more resistant to service wear than is possible with the plain steel blocks. The chromium-plating process will be applied, if desired, to sets of gage blocks returned to the factory for reconditioning.



STANDARDIZED JIG BUSHINGS

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

•
*Send for bulletin containing
complete data and low
prices. Satisfactory
service guaranteed.*

Also manufacturers of complete machine parts, specializing in hardened and ground parts requiring extremely close limits, lapped fits, etc. also hydraulic appliances for pressures up to 20,000 lb. per square inch.

•
ACME Industrial Co.
210 N. LAFLIN ST., - - CHICAGO, ILL.

Carboloy Perfects Extrusion Process

Carboloy cemented carbide now can be produced in the form of tubing, spirals, and round or shaped bars by means of an extrusion process.

Available in lengths up to 20" and within a diameter range of from .015" to $\frac{3}{8}$ " O. D., these rods, spirals and tubes are considered a distinct innovation compared to previous practice. Formerly such parts were available only within an extremely limited size range. With the new process, Carboloy parts are formed directly into the shapes desired, eliminating most of the customary hand forming operations.

To those familiar with the limitations ordinarily encountered in working cemented carbides, the Carboloy tubing

now produced is of especial interest. This can be made as small as .060" outside diameter by .030" inside di-



ameter, leaving a wall thickness of .015".

Particularly interesting is a supplementary process, by means of which Carboloy rods, etc., can be bent to various shapes. The 5" dia. ring illustrated was produced through this process. It consists of a round rod curved to form a ring, with the ends joined together.

Although the processes have by no means reached the stage of maximum utilization, and in some phases are still considered in the process of development, many Carboloy products, such as core bushings for ceramic dies, wire guides, valve needles, triangular glass drills, textile guides, etc., are now being produced by these methods.

In this process, the dry powder is mixed with a plasticising medium and can then be formed by extrusion or molding into almost any shape. It is asserted that the material is as good in every respect as that made by the standard cold press or hot press methods.

Address Carboloy Co., Inc., 11139 E. 8 Mile Blvd., Detroit, Mich., for further details.

Shear Cut

END MILLS

You **Save Time,**
Trouble and Money
 by specifying
PROGRESSIVE
Shear-Cut End Mills.
 They cut faster,
 easier and leave the
 smooth finish you
 want.

Write **TODAY** for
 catalog and prices
 on the complete
PROGRESSIVE Line

PROGRESSIVE TOOL & CUTTER CO.

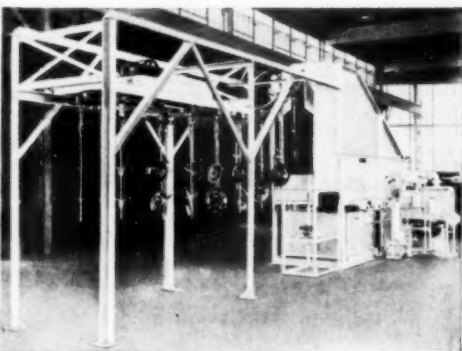
2245 WOLCOTT ST. • FERRDALE, MICH.

One-Dip Type Detrex Degreaser

Outstanding operating and maintenance economies in the cleaning of various metal parts are claimed to result from the unique features incorporated in the one-dip, or liquid-vapor design of Detrex Degreaser. This machine is an addition to the complete line of metal cleaning and finishing equipment made by Detroit Rex Products Co., 13005 Hillview Avenue, Detroit, Mich.

In addition to the usual high speed production cleaning with minimum space requirements, this new design is said to have exceptionally low maintenance requirements combined with thorough cleaning in spite of the heavy carry-in of dirt, metallic chips, and oil.

The cleaning cycle consists of immersing the work in boiling solvent and passing it out through solvent vapors.



At the exit end, there is a light oil spray system that can be used to rust proof the work as is desirable when it is to be placed in storage for any length of time.

The return-type conveyor system is completely self-contained with the load



RED HEAD

ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Magnetic Parallels and Midget Chucks.

Send **TODAY** for latest circulars

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TANNEWITZ DI-SAW

**SAVES AN AVERAGE OF \$4.80
EACH HOUR IT'S USED**



Inside and outside cuts on dies, shoes, templates and endless other jobs can be done in a small fraction of the time required by former methods. Saws, files and polishes. A highly developed, large capacity machine.

Write for literature.

THE TANNEWITZ WORKS

GRAND RAPIDS - MICHIGAN

and unload stations extending approximately 19 ft. from the machine.

This design is manufactured in a wide range of sizes and capacities, but the unit shown is approximately 37 ft. long; 7 ft. 8 in. wide; 12 ft. 4 in. high. Work clearances through the degreaser are:—length, 12 in.; width, 16 in.; depth, 28 in. (58 in. hanging from the top of I-beam to bottom of work.)

Solvent capacity of boiling chamber is 188 gallons, and the clean solvent storage tank is of sufficient capacity to hold all solvent from the machine. The approximate weight, not including solvent still and filter, is 7,500 lbs. The rated production capacity is 10,000 lbs. of work per hour.

Sterling Offers a New Portable Sander

Manufacturers of the Sterling Speed-Bloc Sander (air driven) announce a new product—the Sterling Gyro Electric Sanders.

It has a self-contained, gear-driven electric motor operating at 4000 r.p.m. and can be plugged into any socket.



The flexible sanding pad is said to operate in a movement which closely simulates the hand sanding motion of the skilled craftsman. Abrasive paper is easily attached to the sanding pad and held in place by a special holder. It uses $\frac{1}{4}$ of a standard size 9" x 11" sheet. Any type or make of abrasive paper may be used. It can also be used for rubbing and polishing.

The unit is sturdily constructed for continuous service yet light in weight—3½ lbs. One hand is all that is needed to guide the machine over the work.

For more complete information write Sterling Products Co., at 2459 Woodward Ave., Detroit, Mich.

\$25 BUYS A POSTEL (f. o. b. Minneapolis) DIE FILER



A dependable, precision tool that will soon pay for itself.

Write for full information

The Postel Filing Mch. Co.

915 Washington Ave., So.
Minneapolis, Minn.

NO BELT SLIPS WITH VACUUM CUP METAL PULLEYS



Pat'd U. S.
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Solid and Split

Sizes 2" to 72" Dia.

Shut Off Expense Caused by Slippage
You Save Money on Every Installation

NEW LOW PRICED PRODUCTION LINE

SEE PART LIST Send for List—On the Shelf

PRICES BELOW

Dia.	Face	Price	Dia.	Face	Price
2"	"x2"	\$1.25	4"	"x4"	\$3.20
3"	"x3"	1.45	4"	"x4"	3.35
4"	"x4"	1.65	4"	"x5"	3.95
5"	"x5"	2.25	6"	"x5"	4.75

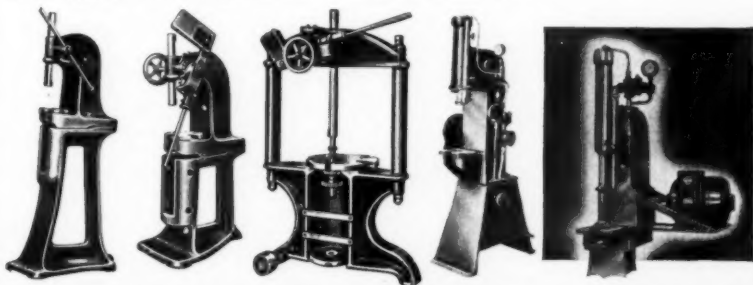
Try one at our risk on your worst drive. You be the Judge.

VACUUM CUP METAL PULLEY CO., INC.
12536 Grand River Ave., Detroit, Mich.

Increase
your
Production

BROACH and ASSEMBLE

65 standard styles and sizes—manually operated presses from $\frac{1}{4}$ to 35 tons pressure—motor driven hydraulic presses from $1\frac{1}{2}$ to 15 tons pressure. *Write for catalog F.*



GREENERD ARBOR PRESSES

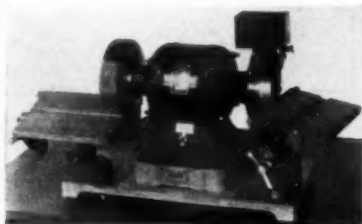
NASHUA

Est. 1883

NEW HAMPSHIRE

FOR CARBIDE TIPPED TOOLS THE ALL IN ONE TOOL GRINDER

Complete with —



TWO WORK TABLES

ONE 6"x1½" GRINDING WHEEL

ONE 6"x½" FACE DIAMOND
SET LAP

ONE PROTRACTOR

110 VOLT, 60 C. A. C. MOTOR
1750 R. P. M.

PRICE COMPLETE.....\$108

220 V. 60 C. 3 PHASE MOTOR \$5.00 extra

230 V. D. C. MOTOR \$10 extra, PEDESTAL IF DESIRED \$20 extra

DELIVERY FROM STOCK

T. C. M. MFG. CO.,**Harrison, N. J.**

Gits Self-Closing Dust Caps

Designed primarily for protecting air hose on road trailers, these self-closing dust caps should have many other applications in industry.

Attached by a 1½" O. D. clamp, the hinged lid is maintained in the closed position by a substantial coiled spring. In trailer use, the caps are clamped around the booster couplings. Air hoses are quickly attached or detached and the spring caps are always ready to spring down into place and exclude

dust and dirt.

Another form of cap is also available for gasoline tank filler openings on



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by using

WALTON TAP EXTRACTORS

They remove taps broken at or below the surface of the hole easily, quickly and without injury to the threads.

Send for Folder 132 giving sizes, styles and prices.

Test their worth by 30-day Free Trial.

The Walton Co.
95 ALLYN STREET
HARTFORD, CONN.



motor vehicles, fitting over a 2 9/16" or 2¼" tank neck. The device is attached to the tank with several small screws. The self-closing hinge lid is reinforced by a lip attached to the top of the lid, adding extra pressure to the gasket seat inside of lid. A cork gasket is placed inside of the flange to prevent leakage.

Full details may be had by addressing Gits Brothers Mfg. Co., 1860 So. Kilbourn Ave., Chicago.

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

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**NIELSEN TOOL &
DIE COMPANY**
1859 Gardner Ave.
Berkley, Mich.



Why Not Buy The Original Electric Etcher?

MARK IRON AND STEEL THE ETCHOGRAPH WAY

New ELKONITE TIP pencil.
New Baby Grand Model at a
lower price.

**2,000
in use**

WILLIAM BREWSTER & CO., INC.
42 Church St., New York, N. Y.

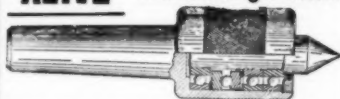
Taking the Machine to the Job

Here's a good example of the practicability, efficiency and convenience of taking the tool to the work, rather than



the work to the tool. A portable Stow flexible shaft machine is shown as it was being used at the Shipyard to grind the bore of the new propeller of the U. S. S. Bear, just before that famous ship set out on the Byrd Antarctic Exploration.

"ALIVE" Ball Bearing Centers



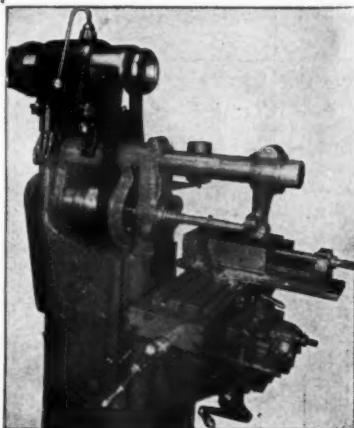
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Write TODAY — and let us tell you more about them.

MODERN MACHINE CORP.
323 Berry St., Brooklyn, N. Y.

New

LIMA GEARSHIFT MOTOR



FEATURES

Eliminates countershafts . . .
4 speed automotive transmission . . . All steel, heat-treated gears run in bath of oil . . . Hand wheel rotation of machine spindle . . . Instant reversability with all speeds . . . Designed for 1800, 1200 and 900 r.p.m. motors, either single or two speed . . . Adaptable for flat or "V" belt . . . Easily installed.

Write for complete information.

LIMA
ARMATURE WORKS, INC.
440 N. MAIN ST. LIMA, OHIO

Tubular Lead Anode for Chromium Plating

A tubular design of lead plating anode, stated to give unusually even throwing power and low resistance for the current discharge surface available, is being manufactured by Acme Lead-Burning Co., 3725 West 73rd St., Cleveland. It may be supplied either pure

lead or in 6% antimonial, as may be specified. This type of enode is particularly recommended for the center anode busbars of a tank, because of the equal current-distribution on all

LUMA

Combination
Etchtool —
— 3 —
Tools
in 1

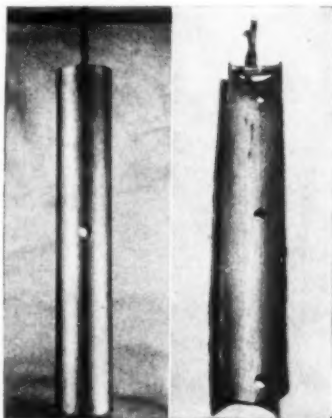


Luma Marking and
Demagnetizing SIMULTANEOUSLY

Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

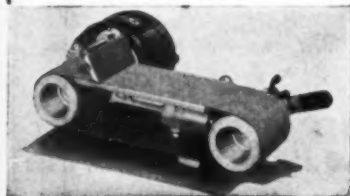
Send for details—5-day FREE TRIAL OFFER!

Luma Electric Equipment Co.
Dept. H—Main P. O. Box 132, Toledo, Ohio



sides. For the anodes of the side busbars a semi-circular pattern is recommended; or the ordinary flat anodes may be employed. It is claimed that because of the simple design and the smaller amount of lead needed, these tubular anodes cost less than the regular flat ones.

AN INEXPENSIVE ABRASIVE BAND GRINDER



"Built Like A Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

Write for illustrated folder on this and other styles and sizes.

WALLS SALES CORP.
96 Warren St., New York, N. Y.

Severance Heavy Duty Countersinks

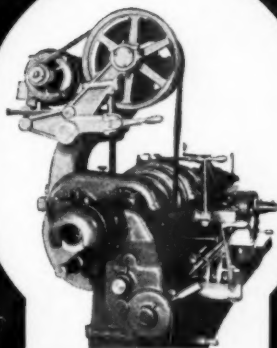


A new heavy duty type of "Chatter - less" countersink has been developed by Severance Tool Mfg. Co., 1510 East Genesee Ave., Saginaw, Mich. It is claimed to overcome the chattering often encountered with countersinks, especially those made from drills, with cutting teeth equally spaced regardless of the number of teeth. The makers emphasize that if countersinks are ground to cut freely, they are prone to chatter and leave the seats serrated. If ground to overcome this chatter, they heat up and cut slowly due to lack of clearance.

It is said that these difficulties have been overcome through a special design of cutting teeth—not alone by staggering of the teeth but by variation of the angle of the tooth face as related to the axis of the countersink. As a result, ample clearance can be provided to assure maximum cutting speed, yet when depth of cut is reached, the countersinks can be withdrawn instantly, leaving smooth, chatter-free seats. It is stated that the seats compare quite favorably under ordinary conditions with commercially ground seats. Where still smoother seats are required, the countersinks may be engineered individually to provide it. In fact, they have been used on some applications to eliminate grinding and lapping operations.

Demand for heavier driving facilities to utilize the full cutting capacity of these countersinks has prompted adoption of the Glenzer Utility sleeves in conjunction with larger shanks having a tang drive. The shanks are straight so they may also be used in standard drill chucks and are adaptable for use in portable drills, drill presses, lathes, screw machines, etc.

The Keyhole to Greater Production and Profits



TORQ DRIVES

open the door to increased production — up to 25% or more—easily installed, they become an integral part of the machine—coupling increased flexibility and efficiency with a marked reduction in operating costs. TORQ DRIVES will bring your equipment up to modern standards of performance.

- Variable Belt Tensioner
- All Steel Welded Column
- All Parts Fixture Machined and Bored
- Rigid Construction
- Self Aligning Ball Bearing Housings
- Neat Appearance
- Easily Installed

Write today for bulletins giving complete information.

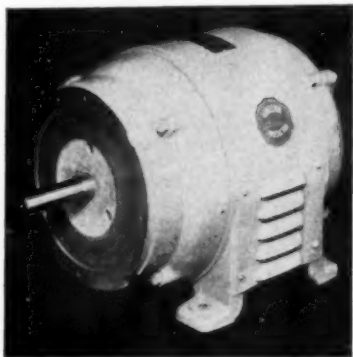
The Torq Electric Mfg. Co.
6606 Carnegie Ave. Cleveland, Ohio

End Shields for U. S. Motors

The U. S. Electrical Motors are now available with unimount end shields. These have a flat surface to facilitate the mounting of pumps and other directly driven equipment and for mounting magnetic brakes. They may be assembled on either end of motor and can be used to mount a footless motor to a machine frame is desired.

The shields may be obtained in a number of standardized outside diameters, mounting machine fits, and bolt

circles. They are also available unmachined which allows the user to machine the mounting dimensions to suit his particular unit.

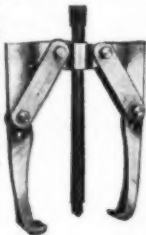


Unimount end shields eliminate the necessity of an adaptor, save mounting time, provide Unclosed Drip-Proof protection for the motor, conserve space, and harmonize with both the motor and the application. U. S. Electrical Motors, Inc.; Dept. 65; 80-34th St.; Brooklyn, N. Y. will gladly send full details.

OTC PULLING SYSTEM

Capacities 5 to 40 TONS
For PLANT MAINTENANCE

The safe, efficient way to remove and replace bearings, gears, wheels, shafts, pulleys, etc. OTC GRIPOMATIC PULLERS (with patented grip) prevent slipping, avoid damage, simplify work in close quarters. SPECIAL PULLERS designed for special needs.



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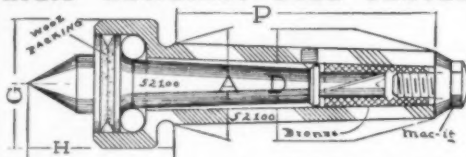
OWATONNA TOOL CO.

355 CEDAR ST. OWATONNA, MINN.

K. O. Lee Presents New Arc Welders

K. O. Lee announces a new line of arc welders consisting of three models—150 amp., 200 amp., and 250 amp. These embody the characteristic design of the former models, having a round,

RIGID RESILIENT BULL CENTER



Rigid Tool Holder Co., 2,000 Witherell St.,
Detroit, Michigan

A disappointed buyer is slow in paying for his disappointment; while we have never yet, lost a dollar, on a purchase order; or a customer that we know of; and seldom send out a "Please remit". But we are real cranky, about good work, and good material. The best is none too good. Excellence in Designing and Manufacturing is Excellence in Advertising.

All Morse tapers carried
in stock.

streamlined case, with an oval dome, and open ventilation at the top. The number of heat taps on the 200 amp. model have been increased from 10 to 14, and on the 250 amp. model from 10 to 16. For heat taps, straight holes with spring pressure plugs are used, which assures good contact because the plugs wipe the holes clean as they are pushed in. The welders are ventilated with cool air entering through the open bottom. Upward movement of air is unimpeded as a greater open area is allowed at the top than at the bottom. The manufacturer compares this construction to a smoke stack, affording a natural draft.

A voltmeter is also available on all models for those who desire it. It is claimed that this is quite essential because many times the line voltage is not great enough to give good welding operation. A two wheel hand truck attachment is also available where it is necessary to transport the welder from one part of the shop to another. Four casters are regularly supplied, but the hand truck attachment has advantages

where the floor is rough or when it is necessary to move the welder far.



For further information, write K. O. Lee & Son Co., Aberdeen, S. D.

Does Your **SURFACE GRINDER** Embody these Modern Features?



Close tolerances — individual motors with variable stepless speed control on each spindle — automatic or manual vertical spindle feed — variable work table speed—maximum wheel life—low operating cost.

These are just a few of the many features of the Type SG-1 Surface Grinder. Write today for further information.

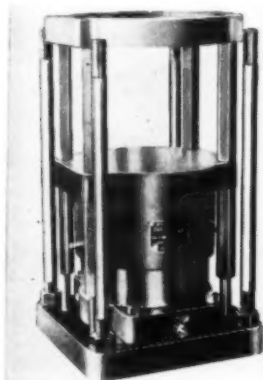
Bergram Mechanical Engineering Co., Inc.

33 Whiting St., New Britain, Conn.

Pneumatic Die Cushion With Slug Clearance

A new model CS pneumatic die cushion has been added to the line now manufactured by the Dayton Rogers Mfg. Co., 2830 South 13th Ave., Minneapolis, Minn.

The new design lends itself to a wide application of installations on various inclinable and straight side presses where it is necessary for the slugs, scrap or blanks to pass through the die proper including bolster plate and pin pressure pad. This cushion design allows the draw ring pressure pins to pass through the bolster plate and come



to rest on the top of the pin pressure pad, allowing the pin pressure pad to bump against the under side of the bolster plate.

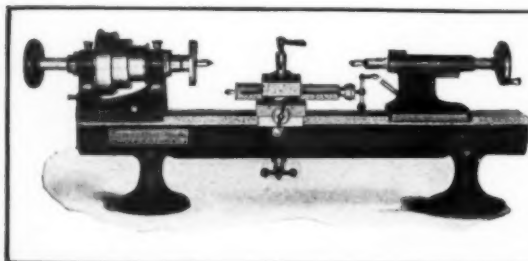
The pin pressure pads can be provided with openings of practically any size up to the size limit of the cushion for slugs, or blank clearance. These openings, of course, allow the slugs, scrap or blanks to fall through the pin pressure pad clear, clearing the top of the die cushion cylinder. This design can also be used to advantage on various compound dies for controlling the stripper plate action.

The cushions are now made in five sizes, from 6" to 14", in 2" steps, having a drawing capacity of from 2" to 6". No surge tanks are necessary in drawing shallow shells up to 1 1/4". This cushion equipment can be attached directly to the bolster plate or provided with suspension rods for press bed installation. Each cushion comes complete with the necessary regulator and gauge, which automatically determines the air pressure used in all cases and maintains pre-determined constant pressure on the cushion cylinder under working conditions at all times.

CP Offers New Universal Electric Drill

In presenting this new streamlined tool for metal or wood drilling up to 1/4" capacity, Chicago Pneumatic Tool Co. emphasize that it was designed particularly for compactness and unusual resistance to wear and abuse.

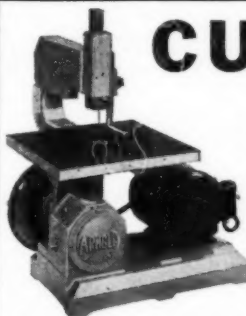
The motor is very powerful and has unusually high torque. It is available in three speeds. The gear case is simple and contains but one pair of helical gears. All bearings are ball bearings mounted in steel inserts. Housings are rugged enough to resist accidental abuse. A bump on the handle cannot



WADE Bench Lathes

Economical, accurate, enduring for turning, drilling, threading, grinding, milling and screw machine operations.

Wade Tool Co.
Waltham, Mass.



CUT 50%

Efficient, accurate, easy to operate and extremely fast, the ARMGLO Die-Filing Machine slashes the cost of sawing, filing and lapping dies, gauges, templates and cams.

It is adapted for any and all kinds of die-making. Over-arm is constructed so that file and saw attachments can be interchanged with little time and effort. Hold down fingers are attached directly to over-arm. Working surface of table, which tilts three directions,

is entirely clear. New type chuck construction holds both saws and files. Screw adjustment makes changes easy and fast. Soon pays for itself through savings which it makes possible.

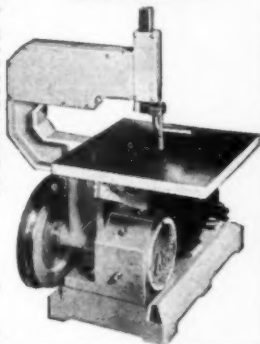
Write TODAY for bulletin!

ARMGLO COMPANY

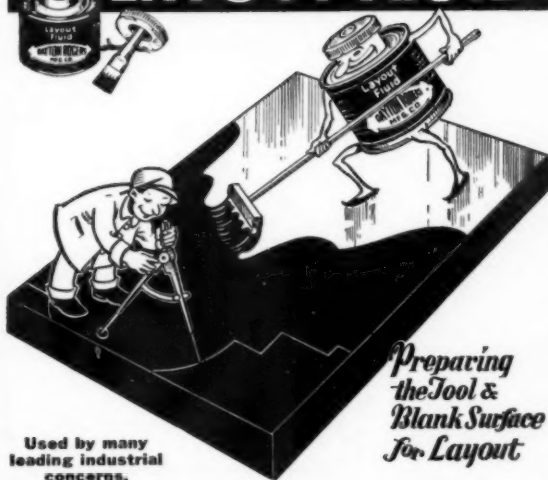
3520 W. Pierce Street Milwaukee, Wis.

Manufacturers of Manual and Automatic Resistance Welding Production Equipment and Belt Surfacing Machines.

FROM YOUR
DIE-MAKING
COSTS
with this
ARMGLO
DIE-FILING
MACHINE



LAYOUT FLUID



Used by many
leading industrial
concerns.

*Preparing
the Tool &
Blank Surface
for Layout*

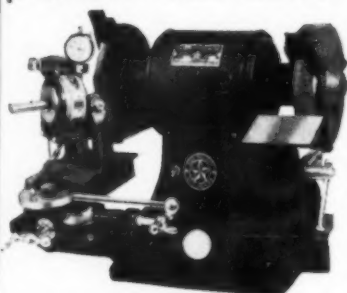
By DAYTON ROGERS

Better than the old copper sulphate method because the scribed lines have a pronounced contrast against the dark background — relieving the workman and allowing the desired layout. May be used to advantage on brass, aluminum, stainless steel, tin, copper, etc. Unnecessary to polish surface — simply wipe fairly clean and brush on — DRIES INSTANTLY.

Free sample if you request it on your business letterhead.

DAYTON ROGERS
MFG. CO.
Minneapolis, Minn.

Precision Drill Grinder



Simple to operate—dependable—speedy—this Precision Grinder will enable you to produce perfect joints on standard twist drills in sizes from No. 41 (.096) to $\frac{1}{8}$ " (.625).

Send today for more details.

Star Machine & Engineering Corp.

Division Star Electric Motor Co.

Bloomfield, - - - New Jersey

distort the bearing alignment since there is no connection between the handle and the bridge supporting the rear armature bearing. The air intake



is on the ends of the handle where it will not be covered by the hand or pick up dirt and chips. There are no screens and the casting is perforated with very small holes. The switch is an oversize two-pole enclosed mechanism with die cast, close fitting trigger attached. The simplicity and large size of the mechanism should assure unusually long life.

This same tool can also be supplied as a Screw Driver for No. 8 wood or 3/16" machine screws; also, as a Nut Runner for 3/16" nuts or bolts.

Address Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. for further details.

VICE For DRILL PRESS

With and Without Jig Attachments
6", 9" and 12" Jaws

Often used
on Miller,
Shaper or
Planer.

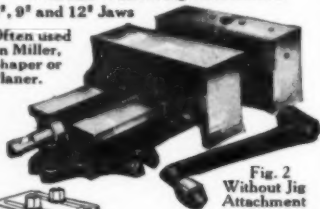


Fig. 2
Without Jig
Attachment

Send for Circulars

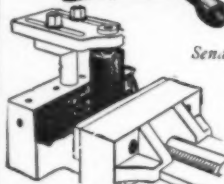


Fig. 3
V-Jaw Holds
Round Work
Vertically or
Horizontally.

THE GRAHAM MFG. CO.

70 Willard Ave.,

PROVIDENCE, R. I.

Centerless Grinding

(CONTRACT WORK)

**PRECISION, FINE FINISH,
LOW COST**

May we quote on your specifications.

THE HEIM COMPANY
Fairfield, Connecticut

Marquette Announces New Arc Torch

Marquette Mfg. Co. of Minneapolis, Minn., introducing their new torch explain that A. C. and D. C. arc welding users have long been handicapped by lack of a suitable attachment for doing the many heating and welding jobs that demand an independent source of heat such as supplied by the gas torch.

With the Marquette Arc Torch and A. C. welding current, that difficulty has been largely overcome. It is now possible



to do general heating jobs; preheating; welding of aluminum, bronze, copper, pot metal, German Silver and other non-ferrous metals; braze; solder; apply hard surfacing paste and in general do most of the jobs heretofore left for gas welding equipment.

It is asserted most of these jobs can be performed as successfully as with gas, and in some cases more successfully, and they can be done at a lower cost than with gas equipment.

The Marquette Arc Torch, it is said, actually operates on less current than when welding with the metallic arc and can be used with any A. C. machine. In many cases the Arc Torch can be operated at no added cost so far as current is concerned, because in many cases owners are not yet using the full share of current to which their minimum charge entitles them.

The Torch is claimed to be ideal for welding aluminum in every size and shape. Its soft, hot, easily controlled flame is especially suited to this application. It has been found by aluminum foundries and factories to be one of

NAILS · RIVETS · SCREWS
MADE TO ORDER IN ANY METAL

HASSALL
Products
CLAY & OAKLAND STS.
BROOKLYN, N.Y.

New
Catalog
Will Be
Ready Soon.

Write for
Illustrated Catalog

HOW MUCH

COMFORT
CAN YOU BUY?



ROOMS
from \$150

WITH
BATH
\$175

also
WEEKLY
RATES

• A wonderful bed, a clean, quiet room, pleasant, efficient service, and a friendly atmosphere — these are what you get, and all you pay for, at the Madison-Lenox. No frills—just genuine comfort and consequently, genuine economy. An excellent location, with garage nearby.

VERNON W. MCCOY, Gen. Mgr.

Detroit

HOTELS MADISON AVENUE AT
GRAND CIRCUS PARK
MADISON and LENOX

the most economical and successful methods yet devised.

When frames, bumper brackets and other parts are to be heated for straightening the Marquette Arc Torch is especially adaptable. Preheating of light castings can be accomplished quickly and efficiently without defacing machined surfaces.

Body metals and soft solders can be run to suit the needs and desires of the job. Accurate control of heat makes

possible a soft flame ideal for this type of work.

Hard solders such as Easy-Flo, Sil-Fos, and other silver solders can be handled with success. This particular application to the repair of copper, brass, monel metal and all ferrous metals will find a ready application in such industries as:—Automotive, Aviation, Refrigeration, Sheet Metal and Plumbing and Heating Shops.

The Torch is packed complete with two 10' cables—2 sets each of $\frac{3}{8}$ " and $\frac{1}{4}$ " Marquette Carbons—2 - $\frac{1}{4}$ " Carbon Adaptors and a set of 2 - Copper Terminal Terminal Lugs besides the two regular Marquette Taper Jacks and a complete set of instructions.

COMPARE! Index No. 39 High Speed VERTICAL MILL

Compare this modern mill to your machine. You'll find that this mill handles 90% of work done on machines costing five times as much.

A thoroughly modern high speed vertical mill—indispensable on jigs, dies, tools, patterns. Mills, drills and bores on straight or angle work. Uses $3/32$ " to $1/4$ " end mills in tool steel. No. 9 B. & S. taper in ball bearing spindle— $3\frac{1}{4}$ " travel.

Milling capacity
8x16x12".

Soon pays for itself through savings which it makes possible. Let us prove it in your plant.

Write for full details.

**BLANK & BUXTON
MACHINERY CO.
Jackson, Mich.**



Reed-Prentice Keyseating Machine

This versatile unit is designed for the machining of keyways, slots, splines, recesses. It can also be used as a light type hand feed vertical milling machine, all of which warrants its consideration for general tool room work, especially in view of the wide range of spindle speeds.

Table, saddle and knee are of conventional type, provided with hand feed in all directions.

Hand wheel controlling table is set obliquely to center line to allow long shafts to overhang each end, permitting adjustment of the table with work in position. Locks are provided for all slides.

Spindle head is reciprocated by an adjustable crank motion, through a compensating device providing constant

MOORE'S SMALL SET SCREWS

Headless 2-56 to 1/2-13

Square Heads 6-32 to 3/8-16

QUALITY — Unsurpassed

QUANTITY — Capacity large enough to fill any order.

GEORGE W. MOORE

44 FARNSWORTH ST.

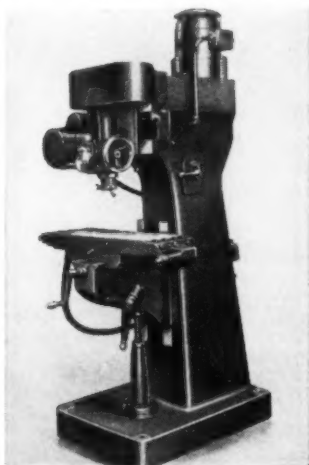
BOSTON, MASS.

For 58 years manufacturers of quality screws.



speed of slide in both directions.

Hand feed and five rates of automatic down feed are provided to the spindle



sleeve. Feeds are independent of the reciprocating travel of the spindle head.

Drive is by a two-speed vertically mounted flanged-fitting motor. Two drives are provided by vee-ropes passing over spring-loaded jockey pulleys. One drive gives a choice of six speeds to the cutter spindle. The other drive, to a worm reduction box mounted inside column, provides a choice of four

rates of reciprocating travel to the spindle head for each spindle speed.

Maximum keyway cut, automatic crank drive is given as $\frac{3}{4}$ "x5"—with automatic crank drive and table adjustment, $\frac{3}{4}$ "x20". Maximum depth of keyway cut is $2\frac{3}{4}$ ".

Address Reed-Prentice Corp., Worcester, Mass., for full details.

At Last!

A Positive, Roll Grip Keyless Drill Chuck...

Check these advantages:

- 1—Drills will not slip.
- 2—100% keyless.
- 3—The heavier the load, the tighter it grips.
- 4—Ends damaged drill shanks.
- 5—Yes! The tapered shanks are tempered.
- 6—Slight twist of the wrist releases drill.
- 7—Scientifically designed, ruggedly constructed.
- 8—Runs true—and remains so.
- 9—Unconditional one-year guarantee (barring abuse).

Send for detailed folder.

Motor Tool Mfg. Co.
12280 Turner Ave.,

Detroit, Mich.



CLOSED

TRADE



CLOSED

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Plain Type

Offset Type

CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

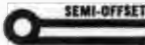
**AUTO MOULDING
& MFG. CO.**

SPECIFICATIONS:
Open Width $\frac{1}{8}$ " to 6"
Gage Material .040 to .125
Pin Diameter .101 to $\frac{1}{16}$ "
Lengths to 120"

THREE-FOURTHS OFFSET.

2326 S. CANAL ST
CHICAGO

SEMI-OFFSET



Hannifin Takes Over Rock River

The Hannifin Mfg. Co. of Chicago has recently acquired the business of the Rock River Machine Co., of Janesville, Wis. The Rock River machine line will be continued, but with improvements and refinements. Engineering, sales and manufacture will be carried on in the Janesville plant.

The line will continue to include all types of vertical and horizontal punches and shears, combination punches and shears, splitting shears, pyramid and pinch type bending rolls, bulldozers, bending and straightening machines, stake riveters, etc. It is reported that the addition of new related products is also contemplated.

Obviously, the Rock River Machine line complements the internationally known line of Hannifin Hydraulic Riveters as well as Hannifin "Allen" Pneumatic Riveters, which are used so extensively in modern high production manufacturing plants.

As a further indication of the growth and expansion of the Hannifin line, it will be noted that a new department has just been established in the Hannifin plant in St. Marys, Ohio, for complete fabrication of welded machine frame structures. In addition to flame cutting and welding equipment, a large furnace for stress-relieving has been

The New Britain Universal VISE

to give you any angle or compound of angles. Swivels 360 degrees horizontally, 100 degrees vertically.



Send today for bulletin.

NEW BRITAIN TOOL & MFG. CO.
NEW BRITAIN, CONN., U. S. A.

"ALNOR" Velometer An All Purpose Air Velocity Meter —Instantaneous, Direct Reading.



Measures total and static pressures as well as velocities.

Write for catalog
ILLINOIS Testing
Laboratories, Inc.
138 W. Austin, Chicago



for
your
lathes

SENECA FALLS Automatic WORK DRIVER

Self Centering... Quick Acting... No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.

CHATTERLESS COUNTERSINKS



We also offer a complete line of Midget Milling Cutters, ground by hand from the solid after hardening. They do a faster, cleaner job than rotary files, last longer and can be reground repeatedly. Unlimited forms, shapes, helix angles, etc., are readily obtainable. Write for full details.

Severance countersinks are designed to take heavy cuts and at the same time produce an amazingly smooth seat. The Cutting teeth are so arranged as to give a shearing cut and make chatter almost impossible. Special countersinks made in various combinations of angles, diameters, lengths, ball nose, double angle, and shank types and sizes.

Submit your problems with full particulars to our engineers or write for Catalog No. 12.

Severance Tool Manufacturing Co.

1510 East Genesee Ave.

Saginaw, Mich.

MARSCHKE Heavy Duty Grinders and Buffers



Considering only such major specifications as weight and sizes of motor, wheels, bearings, spindle diameters, you'll find a lot of other machines to compare with MARSCHKE ELECTRIC GRINDERS and BUFFERS.

But do not overlook the less spectacular and more important items of material specifications, workmanship and particularly the provisions for lubrication, bearing and motor protection, and above all the details of wheel guard construction.

Let us tell you about the details accounting for the superiority of MARSCHKE GRINDERS and BUFFERS.

A catalog showing seventy different grinder and buffer specifications will be sent promptly upon receipt of request.

Vonnegut Moulder Corp.
1805 Madison Ave., Indianapolis, Ind.



Tapping As Fast As You Can Drill ..

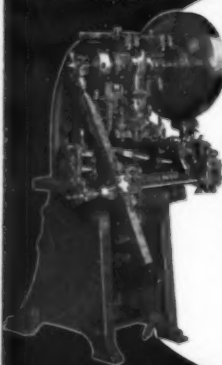
with the A.M. Sensitive Tapping Machine . . . from the smallest and finest up to $\frac{3}{16}$ " diameter in steel and iron—and up to $\frac{1}{4}$ " in softer materials. A modern unit that within its capacity, will take all the punishment intense production can inflict.



Write **TODAY** for
this sure solution of
your small
tapping
problems.

**A. MUEHLMATT DIVISION
OF
THE HAMILTON TOOL CO.
HAMILTON, OHIO**

LITTELL FEEDS for COIL STOCK



LITTELL Roll Feeds economically handle coil stock. Can be mounted on different styles and makes of presses.

LITTELL also makes Feeding and Straightening Machines, Reels for Coil Stock, Scrap Cutters, Oilers, Assembly Machines, Air Blast Valves and Nozzles, and Safety Pickers.

Ask for Bulletin
SEC. 41.



**F.J. LITTELL MACHINE CO.
4153 RAVENSWOOD AVE. CHICAGO, ILL.**

installed, making it possible to produce all-steel welded frames in accordance with most generally approved and modern practice. These additional facilities are said to have been made necessary by the large demand for Hannifin Hydraulic Presses and Hannifin Engineered Hydraulic Machinery.

Kennametal Milling Cutters

McKenna Metals Co., 135 Lloyd Ave., Latrobe, Pa., announces a new series of milling cutters equipped with Kennametal-tipped blades, which have been developed in cooperation with the McCrosky Tool Corp., Meadville, Pa.



The fast machining speeds and high resistance to wear found in Kennametal-tipped single point cutting tools are also characteristic of the new milling cutters. In the job illustrated, the 7" diam. standard McCrosky Jack-Lock Shell End Mill tipped with Kennametal grade KM is milling an S. A. E. 4150 steel forging that was heat-treated before machining to a hardness ranging from 28 to 32 Rockwell C. The cutter is run at 92 r.p.m., said to be approximately five times as fast as was possible with a cutter equipped with high speed steel blade. The feed is $3\frac{3}{8}$ " per min. and the depth of cut .125". An average of 160 faces were

milled before regrinding was necessary.

The new series comprises nine standard sizes in each of the following types of cutters:—medium duty face mills, heavy duty face mills and shell end mills. Incorporated in these milling cutters are exclusive features developed by McCrosky engineers which are asserted to be particularly advantageous when using blades tipped with the hard carbide material, Kennametal. The Jack-Lock Wedge locks the blade with extreme rigidity and may be locked and unlocked without pounding, thus avoiding damage to the blades. In addition, the special adjusting screw in back of each blade permits fine and accurate forward adjustment that holds to a minimum, the amount of expensive carbide material which must be removed to align all blades when regrinding. Blades may be moved forward as little as .002 of an inch. These design features are shown in the 18 blade facing mill illustrated.

The McKenna Metals Co. will gladly furnish complete information on request.

Metal Stripping

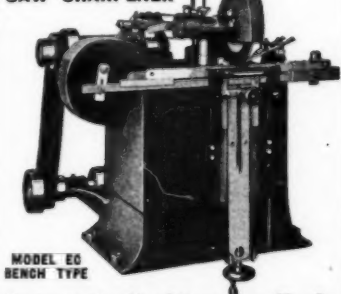
Metastrip is a new product for stripping of baked enamels, varnishes, lacquers, paints, japan, and the new synthetic finishes from steel, zinc, alloys, etc.

Maintained at a temperature of 190/200 degrees F, the work is immersed in Metastrip for about two minutes. Then it is rinsed in hot water, resulting in a clean, bright metal surface.

It is claimed that Metastrip does not injure the hands of the operator and that it is non-inflammable.

A bulletin giving complete details may be had by addressing Surface Finishing Products Co., Westville P. O. Box 2954 No. 14, New Haven, Conn.

WARDWELL SAW SHARPENER



Automatically Sharpens Hack, Band & Circular Saws

with teeth as fine as 32 to the inch,
at a speed of 30 to 75 per minute.

WRITE FOR CIRCULAR

The Wardwell Mfg. Co.
3165 Fulton Rd. Cleveland, O.

Special Anti-Mushrooming Anti-Chipping Heat-treat

Oversize Shanks ▶

Exclusive

Knurled Back ▶

Exclusive

Thumb Grip ▶

Broach-

Rounded ▶

Corners



and
a
complete
line of
Marking
Devices

Write for Price and
data Bulletin No. 113-12 A

**NEW METHOD STEEL
STAMPS, Inc.**

149 Joseph Campau, Detroit

Ammco Bearing Boring Machine and Small Bore Hone

The Ammco bearing boring machine for sizing and finishing con-rod and main replaceable bearings has been



added to the line of tools and equipment manufactured by the Automotive Maintenance Machinery Co., North Chicago, Ill.

It is designed so that insert bearings within a range of $1\frac{1}{2}$ " to $3\frac{1}{2}$ " in di-

ameter, up to 4" in length can be accurately bored to any size depending upon the size of the crankshaft bearings. Machine has balanced flywheel for smooth operation and fine finish of bearings. It has a heavy boring bar $1\frac{1}{2}$ " in diameter, supported in 5" of bearing surface. Power or hand operated.



This machine can also be used for accurately boring sleeves, bushings, and small cylinders, as well as split bearings.

Another useful Ammco tool is the small bore hone for piston pin fitting, honing spindle bolt bushings, water pump bushings, steering sector bushings, honing brake cylinders and other small bores.

This hone has automatic centering cone, push expansion knob and stop collar. Automatic centering cone maintains perfect alignment and permits

WHEN BUYING CUTTERS

look for the name



All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

As Cutter Specialists since 1919 we are able to offer the highest *quality* and *service* at *attractive prices*.

Write today for prices.

Few Territories Open.

QUALITY TOOL WORKS
WAUKEGAN, ILLINOIS

World's Lowest Cost STAMPINGS in small or large lots

Special: Total die and stamping cost for 1000 flat blanks most any shape up to 10 sq. in. **\$25.00.**

We can save you money on all types of sheet metal parts in small quantities.

All types of dies designed and built.

SOUTHERN PRODUCTS
Dept. H10 INDEPENDENCE, MISSOURI

NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to 300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solenoid and motor-operated valves.



Style J



Style E



Style H

Bulletins on request.

OTHER NICHOLSON PRODUCTS: Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.

W. H. Nicholson & Company

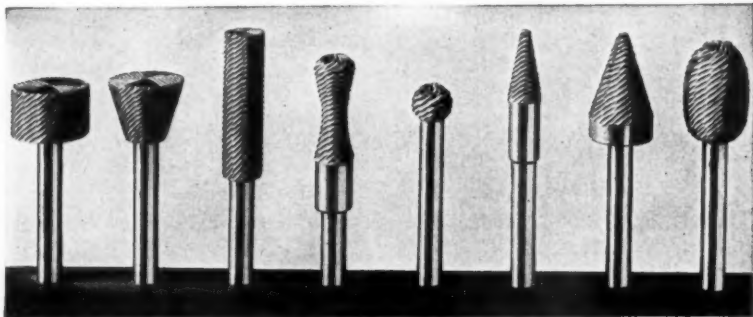
117 OREGON STREET

WILKES-BARRE, PA.

Ford Hand Cut



Rotary Files



Just a few of the many standard shapes which are carried in stock

Send for catalog and full information

413
PERSHING AVE.,

M. A. FORD MFG. CO.

DAVENPORT,
IOWA

grinding each boss separately . . . Stop collar can be set to limit expansion to any desired diameter, and makes it easy to grind all holes to same size when desired . . . Push expansion knob leaves both hands of mechanic free to hold piston, bushing or cylinder, and prevents overgrinding. The tool is fast and gives perfect fit, full bearing surface and mirror finish.

No. 1 Grinder has a range of from 47/64" to 1 5/16". No. 2 covers 1" to 1 5/8".

Bremil Hand Shears

Powerful compound leverage and a rugged all-alloy steel construction that can "take it" are distinguishing fea-

tures of the Bremil portable hand shears. Even the bolts are of special alloy steel. The special alloy cutting blades are removable, and special blades are available for cutting tough stainless steel.



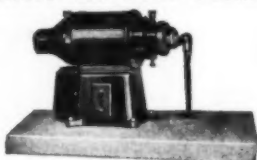
The No. 1 shear is claimed to cut up to 11 gauge with ease, and to do it consistently without springing the jaws. This gives a range well within the requirements of the average sheet metal worker. It weighs 22 lbs. and can be used on the job or on the bench.

It is asserted that the No. 2 mill type shear will operate continuously and safely without overstressing any of its parts, regardless of the man-power exerted on the handle. It is said to operate successfully on 1/4" .40 carbon stock. Weight is given as 28 lbs.

Address Bremil Mfg. Co., 1720 Pittsburgh Ave., Erie, Pa., for a bulletin giving full details.

SCHAUER Speed Lathes

Timesavers for Your Plant



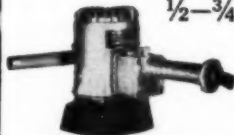
Speedy, economical tools for finishing, lapping and polishing small parts. Hand or foot operated collet, sizes from 1/64" to 1 1/4". Hand, foot or air operated 3-jaw chucks. 1, 1/2 or 3/4 h. p. A. C. 2-speed motor.

Send today for circular 380

SCHAUER MACHINE CO.
2064 Reading Road, Cincinnati, O.

CUTS GRINDING COSTS

1/2—3/4—and MORE



HEAVY DUTY

3 Phase
60 Cycle
No Brushes

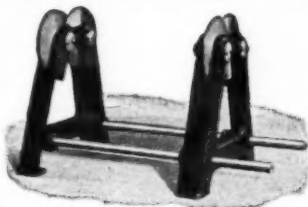
GASTON POWER TOOLS
2655 W. 95th St., Evergreen Pk. Ill.

Excelsior Stainless Steel Sheet Polishing Machine No. 27-H

Polishing Stainless Steel Sheets by the Manufacturer are now available on a paying basis by utilizing the Excelsior simplified patented process.

EXCELSIOR TOOL & MACHINE CO., EAST ST. LOUIS, ILLINOIS

ANDERSON Improved Balancing Ways



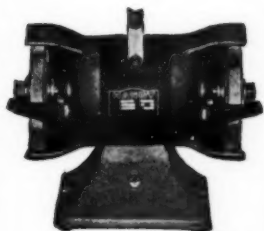
Every shop handling rotating parts needs this simple, sturdy, dependable device for balancing, straightening and truing operations. Saves time and trouble and assures better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

Write NOW for full information.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

ANDERSON BROS. MFG. CO., ROCKFORD, ILL.
1907 Kishwaukee St.



STURDY BUILT-- for Long, Hard Service

A complete line—6" to 12"; Bench and Pedestal Types; All Heavy Duty, Ball Bearing; Price range, \$20.50 to \$175.00.

1 YEAR GUARANTEE.

ABOVE, No. 548, ¼ H. P. \$ 20.50
 AT RIGHT, No. 121, 2 H. P. \$175.00

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 4368 Duncan Ave., St. Louis, Mo.

BALDOR

**BALL
BEARING**

GRINDERS



ANNOUNCING
The M-B "Utility" Pneumatic
Grinder. Model U.—T. R.
A 60,000 R.P.M. Unit



Steel Housing (For Safety)

A WORTHY COMPANION TO OUR
 FAMOUS "SUPER SPEED" MODEL
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 SPECIAL GREASE SEALED BEARINGS
 NO LUBRICATION REQUIRED.
 AN ABUNDANCE OF POWER.
 OTHER MODELS, ALSO AIR LINE FILTERS
 AND AUTOMATIC AIR LINE
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 130 E. LARNED ST. DETROIT, MICH.
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 New York, N. Y., U. S. A.

LET US QUOTE...



Our new modern plant is fully equipped
 with special machinery for

**COMMERCIAL JIG BORING,
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 of
DIES, JIGS AND FIXTURES
LARGE OR SMALL

We can handle your Jig Boring jobs at
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Have been delivering satisfaction since
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QUALITY TOOL & DIE CO.

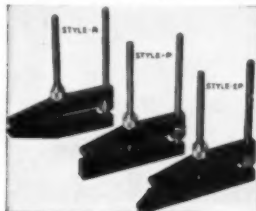
Ray W. Rice, Manager,
 401 N. Noble St., Indianapolis, Ind.

**Hercules Toolmakers' Parallel
 Clamps**

Simple, strong and practical, these
 new Hercules parallel clamps should
 appeal to tool makers. The upper
 knurled nut permits rapid opening
 and closing of the upper jaw. The
 rear hexagon nut is drilled for pin
 or wrench and is said to permit the
 application of greatly increased clamp-
 ing pressures.

Front end of upper jaw is tapered to
 permit convenient clamping under
 shoulders or in recesses.

Lower jaw is fully parallel in form,



and with no protruding screw head on
 bottom, it will lie parallel and will not
 tip.

The clamps are made of case hard-
 ened steel, mottle finished, in two
 convenient sizes and three different types.

Address Hercules Products, Fifth
 and Hooper Sts., San Francisco, Cal.,
 for further details.

**Handling Small Parts at
 Monarch**

An unusual method of handling the
 dozens of small parts that must be
 supplied continually to men on sub-
 assembly lines in shops where a vari-
 ety of different units must be assem-
 bled in small lots, has been worked out
 by the Monarch Machine Tool Co.,
 lathe builders of Sidney, Ohio.

Since lathes are usually assembled
 in groups of less than 25 units of one
 size and type at a time, no standard
 mass production method of constantly
 feeding the same parts to the same
 work bench day after day is possible.
 The conventional method of soiving



such a materials handling problem is for the stock room to bring a supply of parts to each assembler and pile them up on his work bench.

Monarch, however, solves the problem with specially designed cabinets that serve both as delivery trucks and storage units. These parts-assembly trucks, loaded in the stock room with the supply of detail parts conveniently placed in handy compartments, are wheeled to positions alongside the workmen's benches in the assembly department and left there.

Besides, small items, such as pins,

washers, bolts and nuts, are kept in handy 6 x 6 inch bins on top of the cabinet-trucks where there is no danger of being damaged or mixed in with other items or rolling off and getting lost. Parts such as bearings that must be kept clean and actually kept clean, because there is a hinged cover on the top bins and all the compartments are thoroughly cleaned out each time the unit is re-loaded in the stock room.

The units are of all-welded sheet steel construction and consist of nine handy vertical compartments of different sizes, topped by twelve hori-

GROBET Rotary Files ground from the solid



Ask for Catalog WG

the most complete catalog of its kind, illustrating hundreds of rotary files

hand cut, milled cut, ground from the solid; also diesinkers' burs.

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Precision Length Standards



NINE STANDARDS IN SET:

.0625" - .100" - .125" - .200" -
 .250" - .300" - .500" - 1" - 2"
 with or without optical parallel.

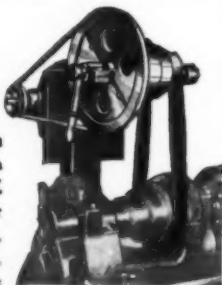
Ask for bulletin No. 135, which discusses many applications for Ultra-Chex for daily use in your shop.

Price as illustrated \$25.00, without optical flat \$19.50.

GEORGE SCHERR COMPANY, INC.
 122 LAFAYETTE STREET, NEW, YORK

GUARANTEED FOR 5 YEARS

When you purchase a **STEEGE Drive** for your lathe, shaper, miller, etc., you're protected by our broad 5-year guarantee.



STEEGE Drives are easily installed—prices \$35.00 up—sent on 30 days' approval. *Let us send catalog.*

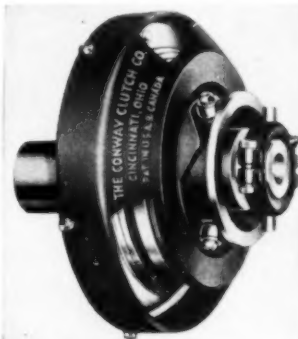
W. L. STEEGE MACHINERY CO.
 (Our 23rd Year)
 548 W. Monroe St., Chicago, Ill.

zontal 6 x 6 inch sections. At the base is a 15 x 36 inch compartment 27 inches deep for extra large parts and storage of the sub-assemblies when they are completed. The units stand 4 feet high, and are narrower at the top than at the bottom so all levels can be seen from above.

Automatic Release Clutches Added to Conway Line

A new series of disc clutches embodying automatic safety features has been added to the Conway line.

In one of these arrangements the clutch slips at a predetermined torque,



stopping the machine if an obstruction or excessive torque is encountered.

Another arrangement provides for slipping of the clutch as soon as an obstruction is encountered, but after a fraction of a revolution of slippage, the clutch disengages itself.

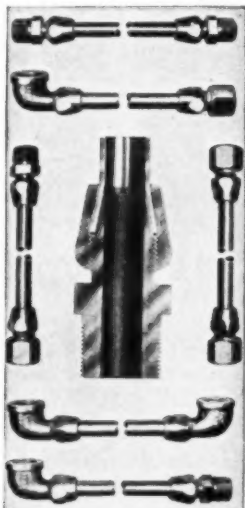
Additional features and functions may be added such as limit switches, acting directly off the clutch and disengaging electrical equipment controlling power on minor movements of the machine.

These new release and slip clutches may be applied to a wide range of machines and conveying systems in which an obstruction can cause damage to the machine, to the product or to the production routine.

Address The Conway Clutch Co., 1541 Queen City Ave., Cincinnati, O., for bulletin S-10.

Superseal Connectors

Illustrated are a few of the new and widely used connectors made by the Superseal Corp., 300 Fourth Ave., New York City, for use with aluminum, brass, copper and steel tubing, etc. They are available in sizes $\frac{1}{8}$ " to 2" in various adaptations and a wide range of lengths.



The effectiveness of this type of connector is attributed to the distinctive design of the superseal couplings, employing the exclusive compression joint, sealed both inside and outside with ends of the tubing flared to a 20 degree angle. This provides a long flare which assures a tight seal with the tubing wedged between the self-aligning compression nut and the fitting. The cut-away view clearly shows this long flare. Leaks or breaks are said to be impossible.

It is asserted that the sealed flare can be loosened and tightened any number of times without injury to the tubing. Another Superseal feature is the full inside diameter of both tubing and fittings. Actually, each fitting is a union in itself.



SAVE Labor and Time

Eliminate heavy lifting. Cut handling costs. Table

swivels and locks in any position. Can be varied $15\frac{1}{2}$ " by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send **TODAY** for illustrated catalog No. 2.

MIDWEST TOOL & ENG. CO.
112 Webster St., Dayton, Ohio

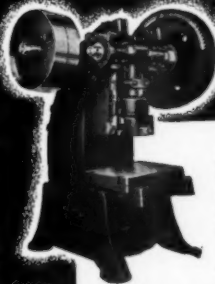
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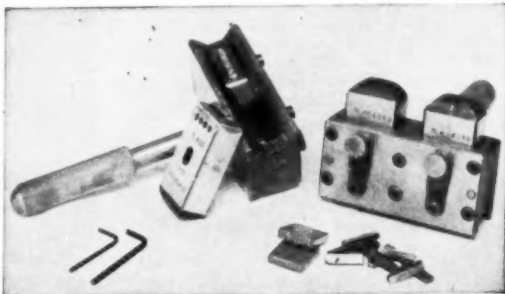
Universal Marking Device for Round Shafts

A universal marking device which permits marking directly on the O. D. of shafts, rods, etc., has been introduced by New Method Steel Stamps, Inc., 143 Jos. Campau St., Detroit. Designed for the optional use of solid or low cost individual type, the device consists of a type retainer and a guide holder.

As shown, the bottom of the guide holder is in the shape of a wide 'V', so proportioned that the sides of the V-guide will rest against virtually any round shaft, providing a support on both sides to align the type and insure clear marking on center.

The type retainer floats in the guide but its travel is limited by a pin in

the guide extending into an elongated hole in the type retainer. Type retainers thus cannot drop out of the guide,



yet have sufficient freedom of movement to rest directly on the shaft to be marked.

Individual type is retained in the retainer by means of set screws. To remove the type retainer from the holder, the pins are merely retracted against spring pressure by means of the knurled knobs shown.

A hardened and ground anvil is provided in the type retainers to prevent type from "sinking."

Armglø Abrasive Band Finisher

The Armglø "Speedster" is a new, totally enclosed, dust collecting finisher.

It should be decidedly useful for sanding, surfacing, polishing and burring of castings, dies, stampings, die castings, moulded products and machine parts.



SOCKET HEAD
CAP SCREWS



SAFETY HOLLOW
SET SCREWS

**MADE OF ALLOY STEEL
MILLED FROM BAR**

*Try Them On Your Next Job!
Or Write For Samples Today.*

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MACHINE PRODUCTS
COMPANY**

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Chicago, Ill.

KUTMORE HIGH SPEED E

Adjustable Hollow
Mills with
Twoway Microm-
eter Adjustment
Cutting capacities
up to 2 1/2".

Ask for Catalog
No. 12.



Reisinger Mfg. Company
837 Lake Ave., ROCHESTER, N. Y.

STACKBINS SAVE— SPACE

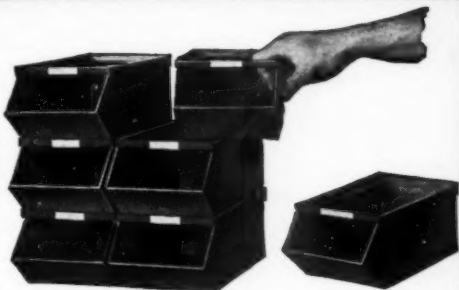
because they stack compactly to form units of exactly the right shape and capacity;

TIME

by keeping parts instantly accessible—by eliminating waste hand motions;

LABOR

by making order-filling or assembly work faster, easier, more efficient.



See how you can save all three with patented STACKBINS—write to Stackbin Corp., 55 Troy St., Providence, R. I., for complete information.

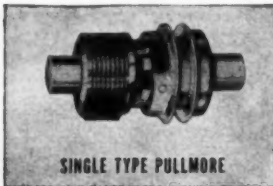
STACKBINS

"STACKED AND STILL ACCESSIBLE"

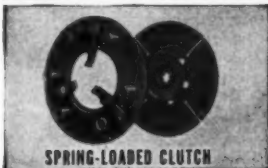
Rockford Clutches for Industrial Equipment



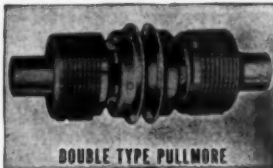
OVER-CENTER CLUTCH



SINGLE TYPE PULLMORE



SPRING-LOADED CLUTCH



DOUBLE TYPE PULLMORE

Pullmore Clutches

Are unexcelled for applications requiring a multiple disc clutch. They are used effectively as main drive clutches carrying all the load, auxiliary clutches controlling individual units, and in power take-off mechanisms to operate various attachments. Pullmore Clutches are available in single and double types, for operation in oil or dry, capacities from 1 h.p. to 7 h.p. at 500 r.p.m.

Rockford Clutches

Spring-Loaded and Over-Center, are ideal for use with gasoline and diesel-engine driven equipment. The Over-Center Clutch remains in or out of engagement until change of direction. The Spring-Loaded Clutch, with its exclusive anti-friction roller, makes operation extremely easy; the Spring-Loaded Type operates like an automobile clutch. Corresponding sizes are generally interchangeable. Rockford Clutches are available in single or double drive plates, for operation in oil or dry in capacities up to 80 h.p. at 100 r.p.m.

ROCKFORD DRILLING MACHINE DIVISION

of Borg-Warner Corporation

410 Catherine Street

Rockford, Illinois, U. S. A.

It uses 4" x 36" abrasive bands and the grinding table is 4½" x 7". The pulleys are 4" x 4½" and it occupies a bench space of 16" x 24". Weight is 70 pounds (boxed 100 pounds) and the driving motor is rated at 1/3 h.p., 60 cycles, 110 volts, 1750 r.p.m. Eccentric tension release makes belt changing simple and easy and the makers emphasize the smooth and vibrationless operation.

The Armglo speedster is a companion tool to the Armglo Die Filing Machine. The latter offers worthwhile cost

saving possibilities on sawing, filing and lapping dies, gauges, templates, cams, etc.



Bulletins fully describing these and the Armglo line of welding equipment will be sent if you write Armglo Co., 3520 W. Pierce St., Milwaukee, Wis.

Machining at 450 Brinell

In announcing Ryerson's new H. T. M. alloy steel in the December issue, it was inadvertently stated that the minimum nickel content was 20%. This was an obvious error and the figure should have been 2%. Our apologies to the readers and to Joseph T. Ryerson & Son, Inc.

—GEARS—

**Spur—Helical—Worm—
Bevel—Miter, Etc.**

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

TAYLOR MACHINE CO.

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TRICO TRADE MARK **AUTOMATIC OILERS**

SAVE TIME—OIL—WORRY

OPTOMATICS and LEVOMATICS maintain a constant level of oil in ring and ball bearings.

The **DRIP-DROP** is a thermal oiler dropping oil on the bearing from the top exactly as needed.

TRICO FUSE MFG. CO.
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WRITE FOR LITERATURE



GOOD NEWS! for DIE MAKERS

**Transfer Points Eliminate
Guesswork in Die Making**

There's no chance for error when you use transfer screws as markers in setting dies. Points are of uniform height above hex base. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in ¼" to 1" diameters.

A TIME AND MONEY SAVER.

HEIMANN MFG. CO.,

URBANA, OHIO

Bates Improves Numbering Machine

Most modern products are numbered for manufacturing and stock record purposes. Government equipment and parts must be numbered and sometimes this presents a problem for the manufacturer or supplier.

The improved Bates machine is compact and handy to use. It is said to permit more numbers within a given space and withstands hard service.

The makers emphasize that the improved machine for numbering from one to 999999 consists of nine parts and four screws as contrasted with 16 parts and three screws




for other types.

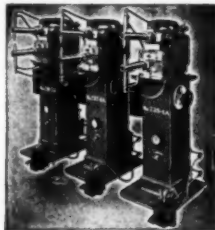
Numbers can be in condensed or extended styles as required. Sizes commonly used range from 1/32" to 3/8", although smaller or larger numbers can be furnished.

Parts are of shock-resisting, long service alloy tool steel and the numbers are finished by hand.

Address H. O. Bates, 251 N. Broad St. Elizabeth, N. J., for further details.



Essex
The makers of a complete line of lubricating devices since 1901.
Send for catalog.
ESSEX BRASS CORP.
2000 Franklin St., Detroit, Mich.



Investigate our NEW VERTICAL PRESS TYPE WELDERS. Its something NEW for precision work. CHAS. EISLER has over 50,000 SPOT WELDERS in daily use, from 1/4 to 500 KVA.

We also make standard and special TRANSFORMERS of all kinds.

WE INVITE CONTRACT SPOT WELDING IN LARGE OR SMALL QUANTITIES.

A. C. Arc Welders from 100 to 400 Amps.

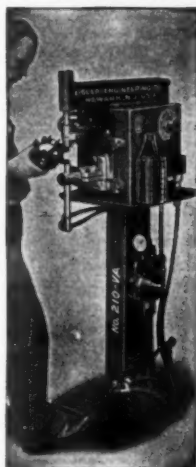
Please write to us for more information.

Kindly mention Hitchcock's Machine Tool Blue Book.

CHAS EISLER
EISLER ENGINEERING COMPANY

762 So. 13th St. (Near Avon Ave.)

Newark, New Jersey



Royle Develops New Cutter

A background of more than 80 years' experience in designing and making routing cutters should assure the efficacy of the new style "D" cutter. Made of high speed steel, the cutters are precision milled to scientifically established shapes, with close attention to the maintenance of proper centers and clearances.



Accurate milling and grinding automatic machinery of exclusive design is followed by careful tempering. The spiral flute is claimed to remove chips and shavings without clogging, leaving a clear path for the tool.

All sizes have 1/4" shanks and the size of cutter is the diameter of circle cut, stated in inch fractions. Sizes available range from 3/16" to 1/2", with 3/8" and 3/4" cutters in the double flute type.

Address John Royle & Sons, Paterson, N. J., for full details.

Additional Models of Leeds Foot Control Switches

Originally announced in the Series A only, two new types of Leeds foot control switches are announced by The Walton Co., 95 Allyn St., Hartford, Conn.



Where the current may have to remain on for considerable intervals, as in drill press operation, or where the operator must be free to move about while the machine is in operation, the Series E switch is required. With this type, the first exertion of foot pressure closes the circuit. The switch

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THE SPEEDMETERS OF INDUSTRY

Productimeters will record accurately your machine output . . . running time . . . idle time, and operating costs. Productimeters count strokes, revolutions, lineal units, bottles, cans, packages, etc., either mechanically or electrically. Also custom-built models for special purposes.

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H. O. BATES

**NAME-PLATE
STAMPING
MACHINE**

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H. O. BATES

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Broad St.

Elizabeth, N. J.




**STYLE
No. 1**

\$95.00

**F.O.B.
ELIZ. N. J.**

**DIES
CAN BE
REPLACED.**



100% Adjustable

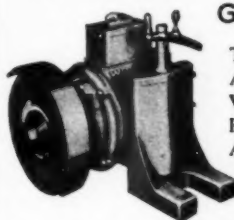
SHOP SPOTLIGHTS

Price \$3.50 in single lots
\$3.25 in lots of six
F.O.B. Chicago

CATALOG FURNISHED ON REQUEST

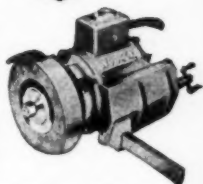
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2502 W. Monroe St. Chicago, Ill.

WODACK GRINDERS



Tool Post
Angle Plate
Vertical and
Horizontal
Adjustment
7 Types

Extension for
internal grind-
ing. Full ball
bearing. Air
cleaner. Also
other types of
lathe grinders,
and portable
hand grinders.



Send for Bulletin 393.

Wodack Electric Tool Corp., 4629 W. Huron St., Chicago, Ill.

NEW... BETTER!

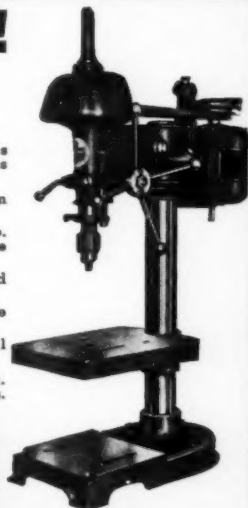
5 BIG IMPROVEMENTS
make the 15" Walker-Turner Bench
Drill "tops" in its class

This new 15" Bench Drill Press—No. 950—has all the advantages of its popular predecessor... plus these 5 valuable new features available in no other drill press at the price:

1. **Extra Big Table**—10"x12½" instead of 10"x9"! Larger than tables on presses selling much higher.
2. **All-Steel Pilot Wheel Feed** with calibrated depth stop. Heavy, quadruple-rod construction for rapid, positive action.
3. **10 Speeds** available through use of special multi-speed attachment. Four standard speeds.
4. **Adjustable Spring Return** on spindle. Soft yet positive action.
5. **Takes No. 1 Morse Taper Drills** through use of special adapter now available.

See it at your local Walker-Turner distributor's show room. Write for his name and new catalog containing all details. Walker-Turner Co., Inc., 1710 Berckman St., Plainfield, N. J.

WALKER-TURNER
LIGHT MACHINES FOR INDUSTRY



then remains locked in the closed position until released by subsequent pressure on the pedal.

The Series A switches close the circuit only as long as pressure is applied to the pedal. In the Series K, this is reversed. Pressure on the pedal opens the circuit, making this a useful emergency normally controlled from some other point.

Developed for use with fractional h.p. motors driving all types of power tools, these switches free both hands for guiding the work or feeding the tools. A new six page bulletin gives full information.

Lewellen Variable Speed Transmission

Maintaining uniform tension in winding strip metal, Lewellen engineers were faced with the problem of making the operation fully automatic. A special variable speed Lewellen trans-

mission with electrical control was developed. Here's the unique result:

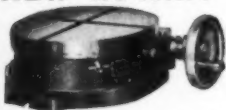
The winding reel starts at its highest speed. As the strip of material on the spool increases in diameter, the control accurately reduces the speed of the reel to maintain uniform tension on the strip as it is wound. After the reel has filled and the unit stopped for removing and replacing it with a new core, the control reverses its position to allow the new reel to start again at



the maximum speed and decrease in speed as it is filled.

For further details address Lewellen Mfg. Co., 1065 E. 10th St., Columbus, Ind.

NEW ROTARY TABLE



New
Design.
High Grade.
Low Priced.

For Millers, Slotters, Die Sinkers, Shapers and Drilling Machines.

Dealers - write for attractive proposition and new printed matter, just off the press.

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Gears for Every Purpose

The most approved type of equipment and skilled craftsmen of our large modern works ensures you of a complete gear service of highest quality. You can always depend upon prompt deliveries.

ILLINOIS GEAR and MACHINE CO.
2114 N. NATCHEZ AVE. CHICAGO

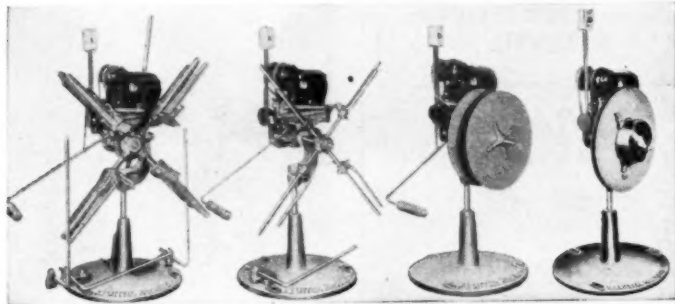


Littell Reels for Light-Gauge Coils

A complete line of light-duty motor-driven reels and winder is announced by the F. J. Littell Machine Co., 4127 Ravenswood Ave., Chicago. They are for use with automatic punch presses, carrying light-gauge material in coils up to 300 lbs. The Reels are available

height, being fully equipped with anti-friction bearings.

Motor-driven reels are used for un-reeling coiled stock into high-speed automatic punch press feeds. The Littell 3G type of reels pictured provide a continuous loose loop of material for the feeding equipment. Further details may be obtained direct from the manufacturer.



in four different sizes. Left to right, Fig. 1 is an automatic centering reel. Fig. 2 is a plain reel with arms. Fig. 3 is a plate type reel. Fig. 4 is a scrap winder.

The reels are fitted with adjustable brakes, Mercoid loop controls and are driven by $\frac{1}{4}$ h. p. geared head motors through V-belt drives. Reels can be used for unreeling stock from right to left or left to right simply by switching the loop control arm from one side to the other. They can be tilted to any angle, and are adjustable in



HANDY RACKS SAVE TIME and MONEY

Tremendous capacity between the knees and shoulders of a man's height and in small floor space. No stooping, stretching or back-breaking. Very valuable in connection with supplying stock to automatic screw or parts-machines.

30 days approval if you wish.

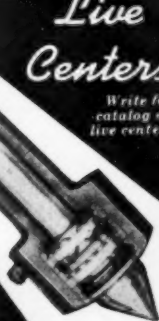
Write today for details.

Wm. S. Yohe Supply Co.
503 Mahoning Rd. N. E., Canton, O.

NIELSEN Heavy Duty *Live Centers*

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live centers

Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.



NIELSEN, INC. LAWTON, MICH.

Now Available 3 NEW

BODY SIZES OF PRESS FIT BUSHINGS CONFORMING TO LATEST A. S. A. REQUIREMENTS.



Three new sizes now complete the standard line of Universal quality drill bushings. All Universals have rust proof black domes and superfinished bores assuring concentricity and unexcelled wearing qualities. Write for facts.

UNIVERSAL

Engineering Company
Frankenmuth, Mich.

Felt Sample File and Chart

The convenience of the combined felt chart-and-sample file introduced several years ago by the Booth Felt Co., 434 19th St., Brooklyn, N. Y., has been



recognized by felt users throughout industry. Such industrialists will be interested in a revised form of application chart now being issued by Booth.

BURKE

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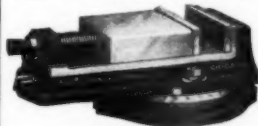
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Armstrong Reversible Ratchet

Armstrong Bros. Tool Co., "The Tool Holder People," 308 N. Francisco Ave., Chicago, announce a new miniature reversible ratchet and 4 new drivers for their miniature detachable head wrenches. The reversible ratchet is only 4" long. It is machined from special chrome vanadium steel finished in chrome plate. The ratchet is of improved design with hardened gear and instant reversing thumb switch. The other 4 miniature drivers added to this series are:—flexible head handle, a screw driven type extension spin-grip which permits locking head so that it can be used also as a spinning extension, and long and short extensions.

Jessop Issues Die Section Chart

Jessop Steel Co., 603 Green St., Washington, Pa., offers a new wall chart which gives the specifications for their rolled composite die sections, used in

dies for cutting sheet metal to regular or irregular shapes.

End views of eight different die sections are illustrated, and the rolled sizes are listed in a readable table. Also included are the weights per foot in lengths of eight to 10 feet, varying from 7.25 lbs. for Section D to 23.94 lbs. for Section CC.

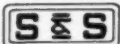
Among the advantages of Jessop rolled composite die sections, as set forth, are ease of machining and forming and the possibility of drilling dowel and screw holes after hardening. Savings claimed over rectangular sections vary from 28% to 47%, depending on the section. Typical applications of sectional dies, ranging from railroad cars to metal toys, are given, as well as the recommended heat treatment.

The chart is printed on heavy, varnished cardboard stock to withstand rough handling. It is available to interested readers without cost.

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Avey Drilling and Tapping Equipment

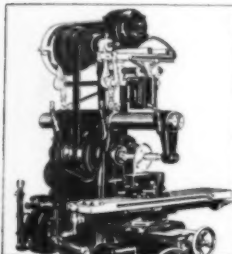
Favorably known in the field of precision drilling and tapping for more than three decades, the Avey line includes types and sizes that meet industry's needs.

The BMA-6 model shown, available in 12" or 15" size, has an extra large table with a working surface 25" x 34", adapting it particularly for tool and die shop use.

The BMA-6 machines provide six or 12 speeds and feature six-splined spindles. Ball bearings are used throughout. The No. 2 size has 12" spindle centers. All moving parts are thoroughly guarded. Electrical controls are in dust-tight enclosures.



BMA-1 machines are similar in general appearance. These are single speed units with constant speed motors—no gears—for manufacturing, single purpose work.



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Put your idle motors to work on Remco Drives. Remco's universal motor mounting will take any motor of reasonable size—new, or used. Only Remco offers this money-saving feature. Motors may be switched instantly, in case of a burn-out. What kind, and size, machines do you want motorized? Let us estimate. The low cost will surprise you. Remco Products Corp., State & Hay Sts., York, Pa.

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Either can be had in multiple units, with one to six spindles.

A full complement of optional extras can be supplied including motor driven coolant systems, Avey-matic feed, friction type tapping attachments, high speed drilling attachments and many other features.

These really modern drilling units and many other styles and types are presented in catalog No. 39, issued by The Avey Drilling Machine Co., Cincinnati, Ohio.

A Sturdy Welders' Clamp

The Hargrave Superclamp No. 43 is a clamp that "can take it" in hard welding service. The frame is of forged steel, heat treated for maximum strength. The screw is especially made of strong and tough spatier-proof material to prevent loading of the threads, bending, breaking or

battering of threads. It is provided with an oscillating ball and socket tip that is put on to stay.



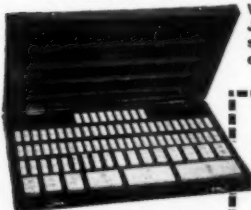
Each clamp is subjected to a rigorous test on a special hydraulic testing machine, during which it is subjected to more than its rated load. In the case of the 4" size, the test load is 8,000 lbs. while the 12" clamp must withstand 12,000 lbs.

Address The Cincinnati Tool Co., 1949 Waverly Ave., Norwood, Cincinnati, O., for a bulletin giving full details.

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UNIVERSAL
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Schultes Drive Refinements

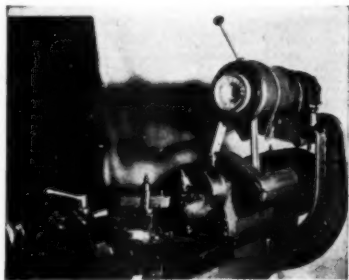
A number of substantial improvements in Model C Schultes Drive are announced by Westlof Tool & Die Co., 428 Bellevue Ave., Detroit, Mich.

All gears are now of the helical type, and are made from high grade heat treated steel.

A synchromesh shift of the full selective single shift lever type enables gear shifting while motor is idling.

Sturdiness is assured by a 30% increase in weight of the drive shaft, together with hardening and grinding of this important member.

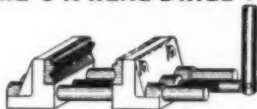
Both shaft ends are provided with Victoprene graphite impregnated oil seals.



Gear ratios have been rearranged and proportioned in such a manner as to meet the requirements of more machine tools with higher efficiency. Ratios on all units are identical.

Three sizes of motor adapters are interchangeable without disturbing gear

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Shur-Grip Jaws 5-in. wide, hardened, reversible; open 5-in. Hold round, square and odd shapes—usable three ways. Satisfaction guaranteed—price, only **\$12.50**.

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65 Massasoit Ave.,

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mechanism. The No. 1 adapter is for special motors from one to five h. p. inclusive. This arrangement reduces the total length approximately six inches and makes a very compact unit. The No. 2 adapter is made to fit standard ball bearing motors equipped with face type and shield mounting, from No. 204 NEMA frame size to No. 254 inclusive. The No. 3 adapter covers the range from No. 284 frame size to No. 364 inclusive.

All Model C Drives are identical in size (exclusive of motor) and made to fit standard cradle brackets regardless of whether a one or a 10 h.p. motor is used.

Motors may be mounted and removed from the unit without moving the drive from its position.

Ball and roller bearings are used throughout. The only maintenance attention required is an annual oil change.

Belt guards and hand wheels meet all safety needs.



DEARBORN Automatic Chucking and Indexing Fixture MILLS OVER 1000 PARTS PER HOUR

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

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- * Hand piece, ball bearings, labyrinth oil-seal.

Bansbach in New Quarters

Bansbach Machinery Corp. is located in attractive new quarters at 3845 W. Madison St., Chicago—in what is generally considered to be the heart of Chicago.

The building was formerly an automobile display room, with a 56-foot frontage on Madison St. The big plate glass full length windows and overhead spotlights make it possible to display a large stock of attractive tools in a very striking manner.

In addition to rebuilt tools, Mr. Bansbach will handle a formidable line of new equipment including:—Robinson presses, Bergram grinders, Portman cut-off machines, Rasmussen saws, Lehman lathes, Kelly shapers, Pexto shears, Demco drills, Knight jig borers, Armglo welders, Amco shapers, Turner Uni-drives, Wickes Bros., lathes, Long & Alstatter press brakes, Sheldon lathes, etc.



Model A

PETERS

Vertical Oscillatory GRINDER

Highly trained workmen are not needed with this modern method of grinding and stoning dies and tools. These modern oscillatory grinders permit production savings up to

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Carbide Tool Grinder and Brazing Fixture

With the wider use of Tungsten Carbide tools, equipment for grinding and lapping is increasing.

The All-In-One grinder is the result of extensive experience in the handling of Tungsten Carbide tools. Safe, flexible and speedy, it is asserted that tool injury is impossible due to the low wheel speed and the use of proper wheels.

The unit is furnished complete with two adjustable work tables. A 6" diameter x 1½" face Silicon Carbide cup wheel is provided for roughing, and a 4" diameter x ¾" face diamond set metal cup lap is furnished for finishing.

Another model is offered especially for grinding and polishing high speed steel and Stellite tools. It is equipped with a 6" x 1½" Aluminous Oxide Cup wheel for roughing, and a 400 grit rubber bonded cup wheel of same size for polishing.

The All-In-One brazing fixture features four adjustable arms which provide for flexibility and a wide range of work. A spring tension device holds the tip during brazing. It is claimed that the device reduces brazing time from 30 to 75% and that through the exact placing of tips, waste of Carbide material is prevented and grinding and lapping costs reduced.

Full details may be obtained by addressing T. C. M. Mfg. Co., 310 First St., Harrison, N. J.

The CHAMPION Line



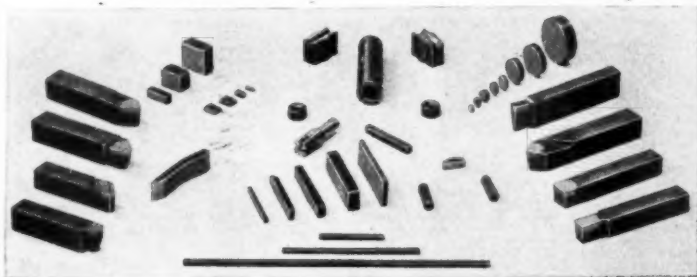
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Armgo Co., Milwaukee, Wis.
- Die Filters**
Armgo Co., Milwaukee, Wis.
- Die Making Machines**
Continental Machine Specialties, Minneapolis
Harvey Mfg. Corp., 161 Grand, New York City
Oliver Instrument Co., Adrian, Mich.
Pratt & Whitney, Hartford, Conn.
Univ. High Speed Tool Co., 549 Wash. Blvd., Chgo.
- Die Makers' Supplies**
Cerro de Pasco Copper Corp., 44 Wall St., New York, N. Y.
- Die Sets**
Denton Rogers Mfg. Co., Minneapolis, Minn.
- Dies, Blank and Forming**
Baumbach Mfg. Co., E. A., 1812 S. Kilbourne Ave., Chicago, Ill.
Danly Mch. Specialties, 2130 So. 52nd, Chgo.
- Dies, Perforating**
Whistler & Sons, S. B., Buffalo, N. Y.
- Dividing Heads**
Wm. Carroll & Son, Norwood, Cincinnati, O.
L-W Chuck Co., Toledo, Ohio
- Dowel Pins, Steel**
Acme Industrial Co., 210 N. Laflin St., Chicago
Baumbach Mfg. Co., E. A., 1812 S. Kilbourne Ave., Chicago, Ill.
- Drawing Instruments**
Wade Instrument Co., Cleveland, Ohio.

Buyers' Directory

- Dressers, Emery Wheel**
Carboly Co., Detroit, Mich.
M & S Dresser, Hartford, Conn.
- Dressers, Grinding Wheel**
Desmond-Stephan Mfg. Co., Urbana, Ohio
- Dressers, Radius**
Bergram Mech. Eng. Co., New Britain, Conn.
- Drill Bushings**
Acme Industrial Co., 210 N. Laflin St., Chicago
Universal Eng. Co., Frankenmuth, Mich.
- Drill Jigs, Spec. & Univ.**
Heuser Mfg. Co., 1638 N. Paulina St., Chicago
- Drills, Core**
Glenzer Company, J. C., Detroit, Mich.
- Drills, Electric**
Chd. Pneum. Tool Co., 6 E. 44th, N. Y. C.
Cincinnati Electrical Tool Co., Cincinnati, Ohio
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Master Tool Co., Cleveland, Ohio
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.
Speedway Mfg. Co., 1822 S. 52nd, Cicero, Ill.
Stanley Electric Tool Div., New Britain, Conn.
- Drills, Pneumatic**
Chd. Pneum. Tool Co., 6 E. 44th, N. Y. C.
- Drills, Taper Shank**
Victor Mch. Exch., 251 Centre, N. Y. C.
- Drill Grinders**
Black Diamond Saw & Machine Works, Inc.,
Natick, Mass.
Gallmeyer & Livingston Co., Gr. Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.
Sellers & Co., Wm., Philadelphia, Pa.
Star Electric Motor Co., Bloomfield, N. J.
- Drill Presses**
Boice-Crane Co., Toledo, Ohio
Delta Mfg. Co., Milwaukee, Wis.
Walker-Turner Company, Plainfield, N. J.
- Drill Press Heads**
Boice-Crane Co., Toledo, Ohio
Delta Mfg. Co., Milwaukee, Wis.
Walker-Turner Company, Plainfield, N. J.
- Drill. Attach., High Speed**
Graham Mfg. Co., Providence, R. I.
- Drilling Machines, Bench**
Ames Co., B. C., Waltham, Mass.
Ayer Drilling Mch. Co., Cincinnati, Ohio
Ayer Mfg. Co., F. H., Chicago Heights, Ill.
Boice-Crane Co., Toledo, Ohio
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Delta Mfg. Co., Milwaukee, Wis.
- Drilling Machines, Multiple Spindle**
Ayer Drilling Mch. Co., Cincinnati, Ohio
Boice-Crane Co., Toledo, Ohio
Buffalo Forge Company, Buffalo, N. Y.
Candy-Otto Mfg. Co., Chicago Heights, Ill.
Delta Mfg. Co., Milwaukee, Wis.
- Drilling Machines, Portable Electric**
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.
Speedway Mfg. Co., 1822 S. 52nd Ave., Cicero, Ill.
White Dental Mfg. Co., S. S., 10 E. 40th, N. Y. C.
Wodak Elec. Tool Corp., 4629 W. Huron, Chicago
- Drilling Machines, Post**
Buffalo Forge Company, Buffalo, N. Y.
- Drilling Machines, Sensitive**
Ayer Drilling Mch. Co., Cincinnati, Ohio
Ayer Mfg. Co., F. H., Chicago Heights, Ill.
Boice-Crane Co., Toledo, Ohio
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Delta Mfg. Co., Milwaukee, Wis.
Hamilton Tool Co., Hamilton, Ohio
Taylor Sales Co., Milwaukee, Wis.
- Drilling Machines, Vertical**
Ayer Drilling Mch. Co., Cincinnati, Ohio
Buffalo Forge Company, Buffalo, N. Y.
- Drilling Mchs., Wall Type**
Ayer Mfg. Co., F. H., Chicago Heights, Ill.
- Drives, Lathes**
Berkeley Engineering Co., Cleveland, Ohio
Drive-All Mfg. Co., Detroit, Mich.
Cullman Wheel Co., 1359 Altgeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.
The Torq Electric Mfg. Co., Cleveland, Ohio
Westhof Tool & Mfg. Co., Detroit, Mich.
- Drives, Machine Tool**
Drive-All Mfg. Co., Detroit, Mich.
The Torq Electric Mfg. Co., Cleveland, Ohio
Westhof Tool & Mfg. Co., Detroit, Mich.
- Drives, Punch Press**
The Torq Electric Mfg. Co., Cleveland, Ohio
- Drives, Shaper**
The Torq Electric Mfg. Co., Cleveland, Ohio
Westhof Tool & Mfg. Co., Detroit, Mich.
- Drives, Turret Lathes**
The Torq Electric Mfg. Co., Cleveland, Ohio
- Dynamometers, Hydraulic**
Taylor Sales Co., Milwaukee, Wis.
- Elevating Tables**
Hamilton Tool Company, Hamilton, Ohio
Midwest Tool & Engineer. Co., Dayton, Ohio
- Emery Wheel Dressers and Cutters**
Western Tool & Mfg. Co., Springfield, Ohio
- End Mills**
Glenzer Company, J. C., Detroit, Mich.
Master Tool Co., Cleveland, Ohio
Midwest Tool & Mfg. Co., Detroit, Mich.
Progressive Tool & Cutter Co., Ferndale, Mich.
Putnam Tool Co., Detroit, Mich.
Renu Tool Company, Detroit, Mich.
Victor Mch. Exch., 251 Centre, N. Y. C.
- Engraving Machines**
Gorton Machine Co., Geo., Racine, Wis.
Luma Electric Equipment Co., Toledo, Ohio
Printz Electric Co., Detroit, Mich.
- Etching Machines, Electric**
Brewster Co., Wm., 50 Church St., N. Y. C.
- Exhaust Blowers**
Buffalo Forge Company, Buffalo, N. Y.
- Experimental Work**
American Tool Works, Inc., Hartford, Conn.
- Extractors, Tap**
Walton Co., Hartford, Conn.
- Facers, Spot**
Circle Tip Tool Corp., East Orange, N. J.
Glenzer Company, J. C., Detroit, Mich.
- Feed Fingers for Auto. Screw Machines**
Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.
Sutton Tool Co., Detroit, Mich.
- Ferro-Molybdenum**
Climax Molybdenum Co., 500 Fifth Ave., N.Y.C.
- Files**
Grobet File Corp. of America, 3 Park Pl., N.Y.C.
Oliver Instrument Co., Adrian, Mich.
Victor Mch. Exch., 251 Centre, N. Y. C.
- Files, All Types**
Nicholson File Co., Phila., Pa.
- Files, Rotary**
Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place,
New York, N. Y.
Hamilton Tool Company, Hamilton, Ohio
Pratt & Whitney Div., Hartford, Conn.
Severance Tool Mfg. Co., Saginaw, Mich.
White Dental Mfg. Co., S. S., 10 E. 40th, N. Y. C.
- Filing Machines**
Continental Machine Specialties, Minneapolis
Harvey Mfg. Corp., 161 Grand, New York City
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.
Univ. High Speed Tool Co., 549 Wash. Blvd., Chgo.
- Filing Room Equipment**
Wardwell Manufacturing Co., Cleveland, Ohio
- Flexible Shafts and Accessories**
Haskins Co., R. G., 623 S. California, Chicago
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stow Mfg. Company, Rindge, N. Y.
Walker-Turner Company, Plainfield, N. J.
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Buyers' Directory

Flexible Shaft Machinery

Haskins Co., R. G., 623 S. California, Chicago
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Pratt & Whitney, Hartford, Conn.
Wyzobeck & Staff, Inc., 838 W. Hubbard, Chgo.

Floating Holders

Glenzer Company, J. C., Detroit, Mich.

Flue Lathes

Marshalltown Mfg. Co., Marshalltown, Ia.

Flue Welders

Marshalltown Mfg. Co., Marshalltown, Ia.

Forming Tools

Circle Tip Tool Corp., East Orange, N. J.
Michigan Tool Co., Detroit, Mich.
Morrison Machine Products Div., Elmira, N. Y.

Furnaces, Industrial

Strong, Carlisle & Hammond Co., Cleveland, Ohio

Furniture, Machine Shop

Standard Pressed Steel Co., Jenkintown, Pa.

Western Tool & Mfg. Co., Springfield, Ohio

Gages

Ames Co., R. C., Waltham, Mass.
Federal Products Corp., Providence, R. I.
Hammond Mch. Builders, Kalamazoo, Mich.
United Precision Products Co., 4618 W. Huron, Chicago

Gages, Auto, for Dies

Daily Mch. Specialties, Inc., 2130 S. 52nd Ave., Cicero, Ill.

Gages, Pin, Plug, Ring and Snap

American Tool Works, Inc., Hartford, Conn.
United Precision Products Co., 4618 W. Huron, Chicago

Gages, Pressure

Marshalltown Mfg. Co., Marshalltown, Ia.

Gages, Taper

Hartford Special Machinery Co., Hartford, Conn.

Gears

Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.
Chicago Gear Works, 440 N. Oakley, Chicago
Taylor Machine Co., Cleveland, Ohio

Generators, Motor

Chicago Elec. Co., 1330 W. Cermak Rd., Chgo.
Lincoln Electric Co., Cleveland, Ohio
Star Electric Motor Co., Bloomfield, N. J.

Grinders, Air

Madison-Kipp Corp., Madison, Wis.

Grinders, Bench

Baldor Electric Co., St. Louis, Mo.
Cincinnati Electrical Tool Co., Cincinnati, Ohio
Delta Mfg. Co., Milwaukee, Wis.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.
Vonnegut Moulder Corp., Indianapolis, Ind.
Walker-Turner Company, Plainfield, N. J.

Grinders, Cutter, Reamer & Tool

Bergman Mech. Eng. Co., New Britain, Conn.

Grinders, Disc

Cincinnati Electrical Tool Co., Cincinnati, Ohio
Gaston Power Tool Co., Evergreen Park, Ill.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
Wyzobeck & Staff, Inc., 838 W. Hubbard, Chgo.

Grinders, Flexible Shaft

Haskins Co., R. G., 623 S. California, Chicago
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Grinders, Hand

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
Cincinnati Electrical Tool Co., Cincinnati, Ohio
Dremel Mfg. Co., Racine, Wis.
Dumore Co., Racine, Wis.
Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

M-B Products Co., Detroit, Mich.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

Grinders, Heavy Duty

Cincinnati Electrical Tool Co., Cincinnati, Ohio
Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, High Speed

Bridgeport Machines, Inc., Bridgeport, Conn.
Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Dremel Mfg. Co., Racine, Wis.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Univ. High Speed Tool Co., 549 Wash. Blvd., Chg.

Grinders, Internal

Bergman Mech. Eng. Co., New Britain, Conn.

Grinders, Pedestal Electric

Baldor Electric Co., St. Louis, Mo.
Cincinnati Electrical Tool Co., Cincinnati, Ohio
Delta Mfg. Co., Milwaukee, Wis.

Grinders, Portable Precision

Maxwell Co., F. A., Bedford, Ohio

Grinders, Precision

Dumore Co., Racine, Wis.

Grinders, Production Surface

Bergman Mech. Eng. Co., New Britain, Conn.
Gallmeyer & Livingston Co., Gr. Rapids, Mich.

Grinders, Snagging

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Grinders, Surface, Auto. Feed

Gallmeyer & Livingston Co., Gr. Rapids, Mich.

Grinders, Swing Frame

Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, Tool

T. C. M. Mfg. Co., Harrison, N. J.

Grinders, Tool Room, Surface

Bergman Mech. Eng. Co., New Britain, Conn.

Grinders, Utility

Bergman Mech. Eng. Co., New Britain, Conn.

Grinders, Univ. Tools & Cutter

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

Grinders, Vert. Oscillatory

Peters Tool Co., Milwaukee, Wis.

Grinding Attachments, Drill

Atlas Press Co., Kalamazoo, Mich.
Carlson Mfg. Co., C. H., Minneapolis, Minn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.

Grinding, Centerless (Contract)

Eastern Centerless Grinding Co., Hartford, Conn.
Heim Company, Fairfield, Conn.

Grinding Machines, Belt

Armco Co., Milwaukee, Wis.

Grinding Machines, Cutter, Reamer and Tool

Brown & Sharpe Mfg. Co., Providence, R. I.
Gallmeyer & Livingston Co., Gr. Rapids, Mich.
Lee & Son, K. O., Aberdeen, S. Dak.
National Machine Tool Co., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.

Grinding Machines, Portable Electric

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.
Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Dremel Mfg. Co., Racine, Wis.

Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

Haskins Co., R. G., 623 S. California, Chicago

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

National Machine Tool Co., Racine, Wis.

Pratt & Whitney, Hartford, Conn.

Stow Mfg. Company, Binghamton, N. Y.

White Mfg. Co., S. S., 10 E. 40th, N. Y. C.

Wodak Elec. Tool Corp., 4629 W. Huron, Chicago

Grinding Mchs., Port. Pneumatic

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

Grinding Wheels

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Guards, Punch Press

Grand Haven Stamped Products, Gr. Haven, Mich.

Guards, Spot Welder

Grand Haven Stamped Products, Gr. Haven, Mich.

Hack Saw Blades

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

Racine Tool & Mch. Co., Racine, Wis.

Victor Mch. Exch., 251 Centre, N. Y. C.

Hack Saw Machines

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

L-W Chuck Co., Toledo, Ohio

Racine Tool & Mch. Co., Racine, Wis.

Hammers, Chipping

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

Master Tool Co., Cleveland, Ohio

Buyers' Directory

Hammers, Portable Electric

Chl. Pneum. Tool Co., 6 E. 44th, N. Y. C.
 Stanley Electric Tool Div., New Britain, Conn.
 Wodak Elec. Tool Corp., 4629 W. Huron, Chicago

Hammers, Riveting

Chl. Pneum. Tool Co., 6 E. 44th, N. Y. C.

Hand Saws, Portable Electric

Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Hand Screw Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Hand Screw Machines, Precision

Hardinge Brothers, Inc., Elmira, N. Y.

Handpieces, Reciprocating

Stow Mfg. Company, Binghamton, N. Y.

Heads, Boring

Flynn Manufacturing Co., Detroit, Mich.

Heads, Die

Eastern Mch. Screw Corp., New Haven, Conn.

Hinges, Continuous Steel

Auto Moulding & Mfg. Co., 2326 S. Canal, Chgo.
 S. & S. Machine Works, 4543 W. Lake, Chicago

Hinges, Plain and Offset

Auto Moulding & Mfg. Co., 2326 S. Canal, Chgo.
 S. & S. Machine Works, 4543 W. Lake, Chicago

Mobs

Illinois Tool Works, 2501 N. Keeler, Chicago

Michigan Tool Co., Detroit, Mich.

Hoists, Chain—Bought and Sold

Logemann, T. V., Normandy (St. Louis Co.), Mo.

Hoists, Chain—Serviced

Logemann, T. V., Normandy (St. Louis Co.), Mo.

Hoists, Electric

Shaw-Box Crane & Hoist Co., 435 Broadway,

Muskegon, Mich.

Index Centers

Brown & Sharpe Mfg. Co., Providence, R. I.

Wm. Carroll & Son, Norwood, Cincinnati, Ohio

L-W Chuck Co., Toledo, Ohio

Indicators, Dial

Federal Products Corp., Providence, R. I.

Indicators, Surface Test

Federal Products Corp., Providence, R. I.

Jigs and Fixtures

American Tool Works, Inc., Hartford, Conn.

Hamilton Tool Company, Hamilton, Ohio

Hartford Special Machinery Co., Hartford, Conn.

Heuser Manufacturing Co., 1638 N. Paulina, Chgo.

Keyseating Machines

Burr & Son, John T., Brooklyn, N. Y.

Lathe Live Centers

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

Lathe Drives

Cushman Wheel Co., 1359 Altgeld St., Chicago

Hardinge Brothers, Inc., Elmira, N. Y.

Lathe, Automatic

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

Lipe, Inc., W. C., Syracuse, N. Y.

Lathe, Back Geared

Atlas Press Co., Kalamazoo, Mich.

Rivett Lathe & Grinder, Inc., Brighton, Boston

South Bend Lathe Works, South Bend, Ind.

Lathe, Bench

Ames Co., R. C., Waltham, Mass.

Boice-Crane Co., Toledo, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Rivett Lathe & Grinder, Inc., Brighton, Boston

Sheldon Mch. Co., 1629 N. Kilbourn Ave., Chicago

South Bend Lathe Works, South Bend, Ind.

Wade Tool Co., Waltham, Mass.

Lathe, Deep Hole Boring

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

Lathe, Engine

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

South Bend Lathe Works, South Bend, Ind.

Lathe, Gap

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

Lathe, Hollow Spindle

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

Lathe, Hydraulic

Lipe, Inc., W. C., Syracuse, N. Y.

Lathe, Manufacturing

Sundstrand Machine Tool Co., Rockford, Ill.

Lathe, Multicut

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

Lathe, Polishing & Buffing

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Lathe, Precision

Elgin Tool Works, Div. Hardinge Mfg. Co., 1772

W. Berteau, Chicago

South Bend Lathe Works, South Bend, Ind.

Lathe, Precision Bench

Hardinge Brothers, Inc., Elmira, N. Y.

South Bend Lathe Works, South Bend, Ind.

Stark Tool Co., Waltham, Mass.

Lathe, Screw Cutting

Hardinge Brothers, Inc., Elmira, N. Y.

South Bend Lathe Works, South Bend, Ind.

Wade Tool Co., Waltham, Mass.

Lathe, Speed

Schauer Machine Co., Cincinnati, Ohio

Lathe, Toolroom

Hardinge Brothers, Inc., Elmira, N. Y.

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

South Bend Lathe Works, South Bend, Ind.

Layout Fluids

Dayton-Rogers Mfg. Co., Minneap., Minn.

Layout Plates

Challenge Mch. Co., Grand Haven, Mich.

Layout Tables

Busch Co., J. C., Milwaukee, Wis.

Leaders Pins, Steel

Acme Industrial Co., 210 Laflin St., Chicago, Ill.

Leather Oil Retainers

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Length Standards

Scherr Co., Geo., 122 Lafayette, N. Y. C.

Lights, Elec. Movable

Zagora Mch. & Gear Co., J., Charlotte, N. C.

Lights, Shop

Chl. Die Cast Mfg. Co., 2502 W. Monroe, Chicago

Vimeo Mfg. Co., Buffalo, N. Y.

Zagora Mch. & Gear Co., J., Charlotte, N. C.

Live Lathe Centers

Glenzer Company, J. C., Detroit, Mich.

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

Lubricators, Air

Norgren Co., C. A., Denver, Colorado

Lubricators, Automatic

M-B Products Co., Detroit, Mich.

Madison-Kipp Corp., Madison, Wis.

Norgren Co., C. A., Denver, Colorado

Lubricators, Engine

Madison-Kipp Corp., Madison, Wis.

Lubricating Devices

Essex Brass Corp., Detroit, Mich.

Magnetic Chuck Demagnetizers

Electro-Matic Products Co., 4036 N. Kolmar, Chgo.

Mandrels

Lee & Son Co., K. O., Aberdeen, S. Dak.

Mandrels, Expanding

Nicholson Co., W. H., Wilkes-Barre, Pa.

Western Tool & Mfg. Co., Springfield, Ohio

Marking Machines

Rates, H. O., Elizabeth, N. J.

New Method Steel Stamp, Inc., Detroit, Mich.

Schmidt, Geo. T., Inc., 1802 Belle Plaine Ave.,

Chicago, Ill.

Meters, Air Velocity

Ill. Testing Lab., 150 W. Austin, Chicago.

Milling Attachments

Bridgeport Machines, Inc., Bridgeport, Conn.

Burke Machine Tool Co., Conneaut, Ohio

Wm. Carroll & Son, Norwood, Cincinnati, Ohio

Kearney & Trecker Corp., Milwaukee, Wis.

Union High Speed Tool Co., 549 Wash. Blvd., Chg.

Milling Cutters

Master Tool Co., Cleveland, Ohio

Victor Mch. Exch., 251 Centre, N. Y. C.

Milling Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Milling Machines, Bench

Burke Machine Tool Co., Conneaut, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Sundstrand Machine Tool Co., Rockford, Ill.

Buyers' Directory

- Milling Machines, Hand**
 Burke Machine Tool Co., Conneaut, Ohio
 Sundstrand Machine Tool Co., Rockford, Ill.
- Milling Machines, Plain**
 Burke Machine Tool Co., Conneaut, Ohio
 Kearney & Trecker Corp., Milwaukee, Wis.
 Sundstrand Machine Tool Co., Rockford, Ill.
- Milling Machines, Precision**
 Elgin Tool Works, Div. Hardinge Mfg. Co., 1772 W. Berneau, Chicago
- Milling Machines, Universal**
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Gorton Machine Co., Geo., Racine, Wis.
 Kearney & Trecker Corp., Milwaukee, Wis.
- Milling Machines, Vertical**
 Hiank & Euxton Mch. Co., Jackson, Mich.
 Gorton Machine Co., Geo., Racine, Wis.
 Kearney & Trecker Corp., Milwaukee, Wis.
- Mills, Hollow**
 Reisinger Mfg. Co., Rochester, N. Y.
- Motors, Electric**
 Drenel Mfg. Co., Racine, Wis.
 Lima Armature Works, Lima, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Star Electric Motor Co., Bloomfield, N. J.
- Motors, Elec. Internal Brakes**
 Star Electric Motor Co., Bloomfield, N. J.
- Motors, Gearhead**
 Lima Armature Works, Lima, Ohio
- Motors, Gearshift**
 Lima Armature Works, Lima, Ohio
- Motors, Saw Arbor**
 Lima Armature Works, Lima, Ohio
- Motors, Worm Gear**
 Lima Armature Works, Lima, Ohio
- Motor Drives, Universal**
 Berkeley Engineering Co., Cleveland, Ohio
 Cullman Wheel Co., 1339 Alameda St., Chicago
 Steege Mch. Co., W., 548 W. Monroe, Chgo.
 Turner Uni-Drive Co., Kansas City, Mo.
- Motor Units, Worm Gear**
 Star Electric Motor Co., Bloomfield, N. J.
- Moulds & Lades, Hammer and Vise**
 Johnson Tool Co., East Providence, R. I.
- Multiple Oilers**
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago
- Nails**
 Hassall, Inc., John, Brooklyn, N. Y.
- Name Plates**
 Bates, H. O., Elizabeth, N. J.
- Nibbling Machines**
 Libert Machine Co., Green Bay, Wis.
 National Machine Tool Co., Racine, Wis.
- Nut Setters**
 Cincinnati Electrical Tool Co., Cincinnati, Ohio
- Oil Cups**
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago
- Oil Gauges**
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago
- Oil and Grease Seals**
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago
- Oilers, Automatic**
 Trio Fuse Mfg. Co., Milwaukee, Wis.
- Pins, Leader and Dowel**
 Arme Industrial Co., 210 N. Laflin St., Chicago
 Baumbach Mfg. Co., E. A., 1812 S. Kilbourne Ave., Chicago, Ill.
 Dandy Mch. Specialties, Inc., 2130 S. 52nd Ave., Cicero, Ill.
- Pipe Threading Machines**
 Triplex Machine Co., Pittsfield, Mass.
- Point Thinning Machines**
 Oliver Instrument Co., Adrian, Mich.
- Polishing and Buffing Machines**
 Excelsior Tool & Mch. Co., East St. Louis, Ill.
- Press Brakes**
 Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.
 Verson Allsteel Press Co., 9303 So. Kenwood, Chi.
- Press Feeds**
 Littell Machine Co., F. J., 4153 Ravenswood Ave., Chicago, Ill.
 Rockford Iron Works, Rockford, Ill.
 Wittek Mfg. Co., 4309 W. 24th Place, Chicago
- Presses, Arbor**
 Atlas Press Co., Kalamazoo, Mich.
 Fanco Machine Co., Racine, Wis.
 Greenerd Arbor Press Co., Nashua, N. H.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago
 Nicholson Co., W. H., Wilkesbarre, Pa.
 Sheldon Mch. Co., 1629 N. Kilbourn, Chicago
 Tomkins-Johnson Co., Jackson, Mich.
 Wilson, K. R., Buffalo, N. Y.
- Presses, Bench**
 Fanco Machine Co., Racine, Wis.
 Greenerd Arbor Press Co., Nashua, N. H.
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.
 Rockford Iron Works, Rockford, Ill.
- Presses, Broaching**
 Greenerd Arbor Press Co., Nashua, N. H.
- Presses, Foot**
 Fanco Machine Co., Racine, Wis.
 Rockford Iron Works, Rockford, Ill.
- Presses, Forming**
 Marshalltown Mfg. Co., Marshalltown, Ia.
- Presses, Hydraulic**
 Beatty Mch. & Mfg. Co., Hammond, Ind.
 Elmes Eng. Works, Chas. F., 244 N. Morgan, Chgo.
 Greenerd Arbor Press Co., Nashua, N. H.
- Presses, Inclined**
 Federal Press Co., Elkhart, Ind.
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.
 Marshalltown Mfg. Co., Marshalltown, Ia.
 Rockford Iron Works, Rockford, Ill.
 Ross Co., David J., Benton Harbor, Mich.
- Presses, Power**
 Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.
 Federal Press Co., Elkhart, Ind.
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.
 Rockford Iron Works, Rockford, Ill.
 Ryerson & Son, Jas. T., 16th & Rockwell, Chgo.
 Verson Allsteel Press Co., 9303 So. Kenwood, Chi.
- Presses, Punch**
 Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.
 Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.
 Marshalltown Mfg. Co., Marshalltown, Ia.
 Rockford Iron Works, Rockford, Ill.
 Ross Co., David J., Benton Harbor, Mich.
- Presses, Sheet Metal**
 Federal Press Co., Elkhart, Ind.
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.
- Profiling Machines**
 Gorton Machine Co., Geo., Racine, Wis.
 Oliver Instrument Co., Adrian, Mich.
- Pullers, Gripomatic**
 Owatonna Tool Co., Owatonna, Minn.
- Pulley Machinery**
 Avee Drilling Mch. Co., Cincinnati, Ohio
- Pulleys, Die Cast**
 Chi. Die Cast Mfg. Co., 2502 W. Monroe, Chgo.
- Pulleys, Vacuum Cup**
 Vacuum Cup Metal Pulley Co., Detroit, Mich.
- Pumps**
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Galland-Henning Mfg. Co., Milwaukee, Wis.
- Pumps, Centrifugal**
 Fulflo Specialties Co., Blanecheater, Ohio
- Pumps, Coolant**
 Tomkins-Johnson Co., Jackson, Mich.
- Punch, Shear and Bender, Hand**
 Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
 Buffalo Forge Co., Buffalo, N. Y.
- Punch Press Guards**
 Ross Co., David J., Benton Harbor, Mich.

Buyers' Directory

Punches and Dies

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Punches, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.

Punches, Hand and Power

Beatty Mch. & Mfg. Co., Hammond, Ind.
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

Punches, Piercing

Durable Punch & Die Co., 2242 W. Grand, Chgo.

Punches, Transfer

McMahon Co., Frank, Dayton, Ohio

Punches and Shears, Comb.

Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

Pyrometers

Ill. Test. Laboratories, 150 W. Austin, Chicago
Pyrometer Instrument Co., 102 Lafayette, N. Y. C.

Pyrometers, Optical

Pyrometer Instrument Co., 102 Lafayette, N. Y. C.

Pyrometers, Portable and Stationary

Pyrometer Instrument Co., 102 Lafayette, N. Y. C.

Racks, Bar Stock

Western Tool & Mfg. Co., Springfield, Ohio
Wm. S. Yohe Supply Co., Canton, Ohio

Rasps

Nicholson File Co., Phila., Pa.

Reamers

Gleazer Company, J. C., Detroit, Mich.
Master Tool Co., Cleveland, Ohio
Reus Tool Company, Detroit, Mich.

Resurfacers, Concrete

Flexrock Co., Philadelphia, Pa.

Rivets

Hassall, Inc., John, Brooklyn, N. Y.

Rivets, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Riveters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.
Tomkins-Johnson Co., Jackson, Mich.

Riveters, Multiple Spindle

Grant Mfg. & Machine Co., Bridgeport, Conn.

Riveters, Pneumatic

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.
Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.
Hannifin Mfg. Co., 621 S. Kolmar, Chicago

Riveting Machines

Buffalo Forge Company, Buffalo, N. Y.
Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.

Riveting Machines, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Rod Cutters

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Rotary Tables

Troyke, Alfred A., Cincinnati, Ohio

Sanders

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.
Stow Mfg. Company, Binghamton, N. Y.

Sanders, Belt

Boice-Crane Co., Toledo, Ohio

Sanders, Disc

Gaston Power Tools Co., Evergreen Park, Ill.

Saws

Black Diamond Saw & Machine Works, Inc., Natick, Mass.

Saws, Electric Hand

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Saws, Metal Cutting

Racine Tool & Mch. Co., Racine, Wis.
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

Saws, Rotary Hack

Stanley Electric Tool Div., New Britain, Conn.

Saw Sharpening Machines

Wardwell Manufacturing Co., Cleveland, Ohio

Sawing Machines

Boice-Crane Co., Toledo, Ohio
Continental Machine Specialties, Minneapolis
Delta Mfg. Co., Milwaukee, Wis.
Wells Mfg. Corp., Three Rivers, Mich.

Scraping Machines, Hand & Pneumatic

Anderson Bros. Mfg. Co., Rockford, Ill.

Screw Drivers, Electric

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.
Cincinnati Electrical Tool Co., Cincinnati, Ohio
Haskins Co., R. G., 623 S. California, Chicago
Stanley Electric Tool Div., New Britain, Conn.
Stow Mfg. Company, Binghamton, N. Y.

Screw Machine Parts

Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Company, Detroit, Mich.

Screw Machine Products

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

Screw Machines, Automatic

Brown & Sharpe Mfg. Co., Providence, R. I.

Screwplates

Threadwell Tap & Die Co., Greenfield, Mass.

Screws

Hassall, Inc., John, Brooklyn, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, Ohio

Screws, Transfer

Nielsen Tool & Die Co., Berkley, Mich.

Set Screws, Headless and Hollow

Economy Machine Products Co., 5207 Lawrence Chicago, Ill.
Moore, Geo. W., Boston, Mass.
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
Triplex Screw Co., Cleveland, Ohio

Shafts, Flexible

Haskins Co., R. G., 623 S. California, Chicago
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Pratt & Whitney, Hartford, Conn.
Stow Mfg. Company, Binghamton, N. Y.
White Dental Mfg. Co., S. S., 10 E. 40th, N. Y. C.

Buyers' Directory

Shears, Bevel
Marshalltown Mfg. Co., Marshalltown, Ia.

Shears, Hand
Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Brenil Mfg. Co., Erie, Pa.
Lowthwaite Machine Co., 311 E. 47th St., New York, N. Y.
National Machine Tool Co., Racine, Wis.
Whitney Metal Tool Co., Rockford, Ill.

Shears, Power
Beatty Mch. & Mfg. Co., Hammond, Ind.
Buffalo Forge Company, Buffalo, N. Y.
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago
Libert Machine Co., Green Bay, Wis.
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.
Stanley Electric Tool Div., New Britain, Conn.

Shears, Slitting
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Buffalo Forge Co., Buffalo, N. Y.
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago
National Machine Tool Co., Racine, Wis.

Shears, Splitting
Marshalltown Mfg. Co., Marshalltown, Ia.

Shears, Throatless
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Marshalltown Mfg. Co., Marshalltown, Ia.
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

Sheet Metal Machinery
Libert Machine Co., Green Bay, Wis.

Sine Tables
Robbins Engineering Co., Detroit, Mich.

Sieves
Glenzer Company, J. C., Detroit, Mich.
Midwest Tool & Mfg. Co., Detroit, Mich.

Sieves, Intermeshing
Durable Punch & Die Co., 2242 W. Grand, Chgo.

Socket Head Cap Screws
Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.

Spacing Collars
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Special Tools and Machinery
American Tool Works, Inc., Hartford, Conn.
Beatty Mch. & Mfg. Co., Hammond, Ind.

Speed Reducers
Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.
Chicago Gear Works., 440 N. Oakley, Chicago
Cullman Wheel Co., 1359 Altgeld St., Chicago

Speed Saws, Universal
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Spindles, Precision Grinder
Maxwell Co., F. A., Bedford, Ohio

Split Rivets
Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Split Rivet Setters, Automatic Feed
Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Spools & Nuts for Auto. Screw Machines
Sutton Tool Co., Detroit, Mich.

Spot Welding Machines, Speed
Interstate Machinery Co., Chicago, Ill.

Sprockets
Cullman Wheel Co., 1359 Altgeld St., Chicago

Stake Riveters
Marshalltown Mfg. Co., Marshalltown, Ia.

Stampings
Hamilton Tool Company, Hamilton, Ohio
Southern Products, Independence, Mo.

Stamps, Steel
Bates, H. O., Elizabeth, N. J.
Colonial Broach Co., Detroit, Mich.
New Method Steel Stamp, Inc., Detroit, Mich.

Static Balanc. Mchs.
Taylor Sales Co., Milwaukee, Wis.

Steam Specialties
Strong, Carlisle & Hammond Co., Cleveland, Ohio

Steel
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

Steels, Shop
Standard Pressed Steel Co., Jenkintown, Pa.

Storage Racks
Stackbin Corp., Providence, R. I.
Yohe Supply Co., Canton, Ohio

Straightening Machines
Whitney Metal Tool Co., Rockford, Ill.

Structural Shop Machinery
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

Studs, Milled
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Surfaces, Wearing
Circle Tip Tool Corp., East Orange, N. J.

Tables, Elevating
Midwest Tool & Engineering Co., Dayton, Ohio

Tables, Spacing
Beatty Mch. & Mfg. Co., Hammond, Ind.

Taps
Threadwell Tap & Die Co., Greenfield, Mass.

Tap Extractors
Walton Co., Hartford, Conn.

Tap Holders
Procnunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Tappers, Electric Portable
Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.
Cincinnati Electrical Tool Co., Cincinnati, Ohio

Tapping Jigs, Univ.
Heuser Mfg. Co., 1638 N. Paulina, Chicago

Tapping Machines and Attachments
Avey Drill Mch. Co., Cincinnati, Ohio
Boice-Crane Co., Toledo, Ohio
Burke Machine Tool Co., Conneaut, Ohio
Errington Mechanical Laboratories, Staten Island, N. Y.
Eltec Tool Co., 594 Johnson Ave., Brooklyn, N. Y.

Haskins Co., R. G., 623 S. California, Chicago
Procnunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Buyers' Directory

Thermometers, Resistance Type

Ill. Test. Lab., 150 W. Austin, Chicago

Threading Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Threading Tools

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Rivett Lathe & Grinder, Inc., Brighton, Boston

Tool Holders

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Michigan Tool Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, Ohio

Tool Post Grinders

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Tool Post Turrets

Colwell, S. G., Providence, R. I.

Tool Reclaim. & Salvage

Eastern Cutter Salvage Corp., Newark, N. J.
Master Tool Co., Cleveland, Ohio
Renu Tool Company, Detroit, Mich.

Tools, Abrasive

White Mfg. Co., S. S., 10 E. 40th, N. Y. C.

Tools, Boring

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

Tools, Carbide Tipped

Super Tool Co., Detroit, Mich.

Tools, Cutting

Circle Tip Tool Corp., East Orange, N. J.

Tools, Diamond Wheel Dressing

Super Tool Co., Detroit, Mich.

Tools, Lathe and Planer

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

Tools, Machinists'

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.

Tools, Pneumatic and Main Parts

Eastern Cutter Salvage Corp., Newark, N. J.
Master Tool Co., Cleveland, Ohio

Tools, Steel Cutting

McKenna Metals Co., Latrobe, Pa.

Tools, Tungsten Carbide

Metal Carbides Corp., Youngstown, Ohio

Torch, Pumpless Gasoline

National Safety Device Co., 836 Hubbard, Chicago

Tracing Sheets

Wade Instrument Co., Cleveland, Ohio

Tube Flanging Machines

Grant Mfg. & Mch. Co., Bridgeport, Conn.

Tubular Rivet Setters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Tungsten Carbide Tools

Circle Tip Tool Corp., East Orange, N. J.
Michigan Tool Co., Detroit, Mich.
Super Tool Co., Detroit, Mich.

Turning Tools

R & L Tools, Nicetown, Phila., Pa.

Universal Joints

American Tool Works, Inc., Hartford, Conn.
Chicago Gear Works, 440 N. Oakley, Chicago

Used and Rebuilt Machinery

Aaron Machinery Co., 176 Lafayette St., N. Y.
Acme Equipment Co., 128 S. Clinton, Chicago
Adams, Ogden R., Rochester, N. Y.
Baushach Mch. Corp., 3545 W. Madison, Chgo.
Beunet-Hafkin Machine Tool Corp., 30 Church St., New York, N. Y.
Bernstein & Co., Geo. M., 12 S. Clinton, Chgo.
Bieser Mch. Co., Springfield, Ill.
Botwinik Brothers, Inc., New Haven, Conn.
Bradley Mch. Co., Detroit, Mich.
Brandes Mch. Co., Cleveland, Ohio
Brooks Co., A. D., Boston, Mass.
Brown Machinery Co., St. Louis, Mo.
Brownell, Hazard, Providence, R. I.
Cincinnati Mach. & Supply Co., Cincinnati, O.
Daukels, C. R., Milwaukee, Wis.
Davis Mch. Co., Toledo, Ohio
DeWitt Tool Co., 173 Grand St. N. Y. C.
Dony Mch. Co., D. E., Rochester, N. Y.
Eastern Machinery Co., Cincinnati, Ohio
Elyria Belt & Mch. Co., Elyria, Ohio
Guerman, Louis E. & Co., 1761 Elston, Chicago
Essley Machinery Co., E. L., 831 W. Evergreen Ave., Chicago, Ill.
Falk Mill Supply Co., Inc., Rochester, N. Y.
Friedrich, Inc., Ed., San Antonio, Tex.
General Blower Co., 401 N. Peoria St., Chicago
Goldman & Co., Harvey, Detroit, Mich.
Harris Electric Supply Co., 627 Wash. Blvd., Chgo.
Hasco, Inc., Newark, N. J.
Hill, Clarke & Co., 645 W. Washington, Chgo.
Howarth Mch. Co., C. C., Detroit, Mich.
Hymant & Sons, Joseph, Philadelphia, Pa.
Indianapolis Mch. & Supply Co., Indianapolis
Indianapolis Screw Products Corp., Indian. Ind.
Industrial Machinery Co., Indianapolis, Ind.
Inland Machinery Co., 41 S. Clinton, Chicago
International Mch. Co., Detroit, Mich.
Interstate Machinery Co., 109 S. Clinton, Chgo.
Irequis Machinery Co., Buffalo, N. Y.
Johnson & Sons Mch. Co., Wm. C., St. Louis
Jones Machine Tool Co., Cincinnati, Ohio
Klauber Machinery Co., St. Louis, Mo.
Lake Machinery Co., 656 W. Lake, Chicago.
Lang Machinery Co., Pittsburgh, Pa.
Laurens Bros., Cincinnati, Ohio
Logeman, T. V., Normandy (St. Louis Co.), Mo.
Lowe Co., Chas. E., Hartford, Conn.
Lucas & Son, J. L., Bridgeport, Conn.
McDonald Machinery Co., St. Louis, Mo.
Machinery Dealers, Inc., New Haven, Conn.
Marr-Galbreath Mch. Co., Pittsburgh, Pa.
Miles Machinery Co., 2025 Genesee Ave., Saginaw, Mich.
Morey Machinery Co., Inc., 410 Broome St., New York, N. Y.
Morris Machinery Company, Inc., Newark, N. J.
Morton Mch. Co., H. L., Cleveland, Ohio
Moser Mch. Tool Sales, Milwaukee, Wis.
Nelson Machinery Co., Green Bay, Wis.
Northwest Auto Products Corp., Minn., Minn.
Norton-Broadway Machinery Co., Cincinnati, O.
Nutmeg State Mch. Corp., New Haven, Conn.
O'Brien Machinery Co., Philadelphia, Pa.
Osborne & Sexton Machinery Co., Columbus, O.
Ott Mch. Sales, Inc., Detroit, Mich.
Passman Bros., 705 W. Washington, Chicago
Reere-Fritts Co., 28 N. Clinton, Chicago
Regar, S. M., Tampa, Fla.
Reliance Machinery Sales Co., Pittsburgh, Pa.
Riverside Mch. Depot, Detroit, Mich.
Rosenkranz & Weisbecker, 2309-A Singer Bldg., New York City
Scott Mch. Inc., 1811 Carroll Ave., Chicago.
Segal Machinery Co., 117 S. Clinton St., Chicago
Simmons Machine Tool Corp., Albany, N. Y.
Standard Machinery Co., Grand Rapids, Mich.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sun Machinery Co., Newark, N. J.
Surplus Stock & Mch. Co., Inc., 618 W. Lake St., Chicago, Ill.
Triplex Mch. Co., Pittsfield, Mass.
United Machinery & Supply Co., St. Louis, Mo.
Victor Mch. Co., 130 S. Clinton, Chicago

Buyers' Directory

Used and Rebuilt Machinery—Cont.

Victor Mch. Exchange, 251 Centre St., N. Y. C.
Vine, R. A., Detroit, Mich.
Wachs-Gregg Co., 1535 Dayton, Chicago
Webb Mch. Co., O. T., Milwaukee, Wis.
West Penn Machinery Co., Pittsburgh, Pa.
White Mch. Co., A. D., 108 N. Jefferson, Chgo.
Wiggleworth Machinery Co., Cambridge, Mass.
Winterhoff Mch. Co., Detroit, Mich.
Zeeve, Alex., 2280 Woolworth Bldg., N. Y. C.

Valves

Galland-Henning Mfg. Co., Milwaukee, Wis.
Hanna Engineering Works, 1763 Elston, Chicago
Ross Operating Valve Co., Detroit, Mich.

Valves, Air

Air-Way Pump & Equip. Co., 625 Jackson, Chgo.
Bell Machine Co., Oakshosh, Wis.
Galland-Henning Mfg. Co., Milwaukee, Wis.
Hanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar, Chicago
Ross Operating Valve Co., Detroit, Mich.
Tomkins-Johnson Co., Jackson, Mich.

Valves, Auto. Self-Open.

Bell Machine Co., Oakshosh, Wis.

Valves, Foot, Lever & Solenoid

Berkeley Engineering Co., Cleveland, Ohio
Hanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar, Chicago
Nicholson Co. W. H., Wilkesbarre, Pa.
Ross Operating Valve Co., Detroit, Mich.

Valves, Hydraulic

Berkeley Engineering Co., Cleveland, Ohio
Galland-Henning Mfg. Co., Milwaukee, Wis.
Hanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar, Chicago
Ross Operating Valve Co., Detroit, Mich.

Valves, Oil Relief

Fulflo Specialties Co., Manchester, Ohio

Valves, Operating

Berkeley Engineering Co., Cleveland, Ohio
Galland-Henning Mfg. Co., Milwaukee, Wis.
Hanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar, Chicago
Ross Operating Valve Co., Detroit, Mich.

Variable Speed Devices

Continental Mch. Spec., Minneapolis, Minn.

Vises, Air

Hannifin Mfg. Co., 621 S. Kolmar, Chicago

Vises, Drilling Machine

Armstrong-Bunn Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Desmond-Stephan Mfg. Co., Urbana, Ohio
Graham Mfg. Co., Providence, R. I.
Heuser Mfg. Co., 1638 N. Paulina, Chicago
Johnson Tool Co., Inc., East Providence, R. I.
L-W Chuck Co., Toledo, Ohio
Martin Tool & Die Works, Springfield, Ohio
Modern Mch. Tool Co., Jackson, Mich.
National Machine Tool Co., Racine, Wis.
Plunket Machine Co., 1823 W. Lake St., Chicago
Sheldon Mch. Co., 1629 N. Kilbourn, Chicago

Vises, Machinists'

Desmond-Stephan Mfg. Co., Urbana, Ohio
L-W Chuck Co., Toledo, Ohio
New Britain Tool & Mfg. Co., New Britain, Conn.
Sheldon Mch. Co., 1629 N. Kilbourn, Chicago
Western Tool & Mfg. Co., Springfield, Ohio

Vises, Milling Machine

Desmond-Stephan Mfg. Co., Urbana, Ohio
Graham Mfg. Co., Providence, R. I.
Hartford Special Mch. Co., Hartford, Conn.
L-W Chuck Co., Toledo, Ohio
Plunket Machine Co., 1823 W. Lake St., Chicago
Sheldon Mch. Co., 1629 N. Kilbourn, Chicago

Vises, Shaper

L-W Chuck Co., Toledo, Ohio
Plunket Machine Co., 1823 W. Lake St., Chicago
Sheldon Mch. Co., 1629 N. Kilbourn, Chicago

Vises, Special

Modern Machine Tool Co., Jackson, Mich.

Water Cooling Devices for Spot Welders

Eisler Eng. Co., Inc., Newark, N. J.

Welders, Arc

Hobart Brothers Co., Troy, Ohio
Lincoln Electric Co., Cleveland, Ohio

Welders, Arc, Diesel Driven

Lincoln Electric Co., Cleveland, Ohio

Welders, Automatic, A. C.

Lincoln Electric Co., Cleveland, Ohio

Welders, Arc, A. C. Type

Eisler Eng. Co., Inc., Newark, N. J.

Welders, Arc, Engine Driven

Lincoln Electric Co., Cleveland, Ohio

Welders, Gun

Acro Welder Mfg. Co., Milwaukee, Wis.

Welders, Portable

Hobart Brothers Co., Troy, Ohio
Lincoln Electric Co., Cleveland, Ohio

Welders, Resistance

Acro Welder Mfg. Co., Milwaukee, Wis.
Armgo Co., Milwaukee, Wis.

Welders, Seam

Acro Welder Mfg. Co., Milwaukee, Wis.

Welders, Spot

Acro Welder Mfg. Co., Milwaukee, Wis.
Armgo Co., Milwaukee, Wis.
Dyer Welder & Eng. Co., Kansas City, Mo.

Welding Accessories

Hobart Brothers Co., Troy, Ohio
Lincoln Electric Co., Cleveland, Ohio

Welding Electrodes and Holders

Hobart Brothers Co., Troy, Ohio
Lincoln Electric Co., Cleveland, Ohio

Welding Electrode Tips

Eisler Eng. Co., Inc., Newark, N. J.

Welding Generators, Arc

Hobart Brothers Co., Troy, Ohio
Lincoln Electric Co., Cleveland, Ohio

Welding Machines, Electric Spot

Armgo Co., Milwaukee, Wis.
Eisler Engineering Co., Inc., Newark, N. J.

Welding Machines and Equipment, E. I. Arc

Hobart Brothers Co., Troy, Ohio

Welding Protective Equipment

Lincoln Electric Co., Cleveland, Ohio

Woodworking Machinery

Tannerwitz Works, Grand Rapids, Mich.

Wrenches, Pneumatic

Chi. Pneu. Tool Co., 6 E. 44th, N. Y. C.

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Millers, Becker vertical Nos. 2, 2A, B-1, 5B.
Miller, No. 2 Cincinnati universal, heads, like new.
Pipe machines, Oster, Williams, 2', 4', 6', 8', m. d.
Press, No. 10 Z. & H. percussion.
Punch, Long & Alistair multiple, 48" bet. housings, 72" bed, 175-ton ram pressure, wgt. 17-ton, 10" gap.
Screw machines, Acme 53, 56, 76.
Screw machines, B. & S. automatic, Nos. 0, 0G.
Shapers, 16", 18", 20", 24".
Welders, butt Federal, 15 k. w., 35 k. w.

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Grinders, No. 70, No. 75 Heald internal, m. d.
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Grinder, No. 3 Brown & Sharpe, planer type, m. d.
Hammer, 500 lb. Bradley upright helve, m. d.
Miller, No. 3 Cincinnati plain, high power.
Press, 50 ton Lucas forcing.
Press, No. 5 Toledo, o. b. i.
Shaping saw, 6x6 Peerless univ., m. d.
Thread mill, No. 3 Lees Bradner,

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FOR SALE BY

Mayer Machinery Co.

742 Osage Street Fort Wayne, Ind.

Air compressor, Ingersoll-Rand, 475 cfm., syn., b. m. d.
Air compressor, Worthington, 14x12, syn. b., m. d.
Air compressor, Worthington, 15x16, Duplex, 1420 cfm.
Air compressor, Curtis 8x9 & 8x8, Duplex.
Automatics, 18", 18", 3 1/2"/16" model G, m. d.
Potter & Johnson 5A and 6A, m. d.
Lathes, Prentice, 14x8, 16x8, 18x8, grd. hd., m. d.
Press, 55x Toledo, tie rod, roll feed, m. d.
Press, Lucas 15 ton forcing, m. d.

FOR SALE BY

Segal Machinery Company

117 S. Clinton St., Chicago, Ill.

Automatics: 5A & 6A Potter & Johnston and Fay's.
Broaches, V-18 American; No. 3 LaPointe, 2 spindle.
Gear hobbers, No. 3 & No. 12 Barber-Colman, m. d.
Grinder, No. 33 Abrasive, mot. dr., 5" cup wheel.
Lathes, 12x5, 14x6, 16x8, 20x8, Mon-LeBlond—q. c. g.
Millers, No. 2 B. & S. & Kemp univ. fully equipped.
No. 2 Garvin duplex; 24" Cincinnati duplex.
Nibblers, Nos. 1B & 2 Campbell, 8" cap. 24" throat.
Punch presses: No. 42 Toledo horn; No. 540 Max.
Ams. str. sid.—Back Gear, 8" stroke, No. 4 Bliss-Com.
Radial drill, 3/4" American triple purpose, s. p. d.
Screw machines, No. 4 & 6 W. & S., Plain & universal.
Shapers, 16", 20", 24", 28", G. & E., Mil. and Amer.
20" Rockford, hy-service, motor drive.
Swedger, No. 4 Langelier, power infeed.

Partial list—Send us your inquiries.

FOR SALE BY

Tranter Manufacturing Company

105 Water Street Pittsburgh, Pa.

Band saws, 36", 32", belt drive.
Band saw, 16" Wallace, d. m. d.
Moulder—6", 4 side (Houston).
Moulder—8", 4 side (American).
Moulder—10", 4 side (Fay & Egan).
Saw, Beach, wood top 26"x46, foot operated, cutoff, stationary rip.
Saw, with c. s., all iron, top 22"x44".
Saw, no c. s., all iron, top 28"x25".
Shaper, Josias combination rip & crosscut saw and single spindle shaper, friction rev. c. s.
Swing saw, 4' arm.
All machines primed to move quickly.

USED AND REBUILT MACHINERY

FOR SALE BY

D. E. Dony Machinery Co.
47 Laurelton Rd., - Rochester, N. Y.
 Drill, Sibley 24" sliding head.
 Gear hobber, Adams No. 1.
 Hammer, Pettigell No. 2 bumping.
 Lathe, Hamilton 16"x8".
 Lathe, Mulner 14"x6", taper attachment.

FOR SALE BY

Hazard Brownell, Machine Tools
350 Waterman Street, Providence, R. I.
 Grinder, No. 2 Diamond, automatic surface.
 Lathe, 60"x18" New Haven, 38" h. s.
 Lathe, 22"x12" Sidney heavy duty, q. c. g.
 Homer, Hutto s. s. vertical.
 Milling machine, No. 5-C Becker.
 Shear, 30" Pawtucket sitting, 7/16".

FOR SALE BY

General Blower Company
401 N. Peoria St., - Chicago, Ill.
 BLOWERS—FANS—EXHAUSTERS.
 For Dust Collecting—Ventilating.
 Oil and gas burners, cupolas, furnaces, etc.
 Roots—Connersville and centrifugal blowers.
 What are your blower requirements?

FOR SALE BY

Jones Machine Tool Company
Front & Pike Sts., Cincinnati, Ohio

LATHES

24"x30" Lodge & Shipley, q. c., cone drive.
 18"x8" Monarch grd. head, motor drive.
 16"x10" Lodge & Shipley, q. c., cone drive.
 18"x10" Hendey tie bar head, q. c., cone drive.
 20"x14" Hendey, tie bar head, q. c. cone drive.

MILLERS & GRINDERS

No. 2 Kemp Smith plain c. d. No. 2 W. & M. Grinder.
 No. 2 hvy. B. & S. plain c. d. No. 3 W. & M. Grinder.
 No. 25 hvy. Ohio univ. c. d. No. 32 Abrasive m. d.
 No. 4 Cincinnati, plain c. d. No. 1 W. & M. Grinder.
 No. 2-B Brown & Sharpe plain, s. p. d.

PRESSES

No. 6-A Toledo, open back inclinable.
 No. 6-H Toledo, open back inclinable, geared.
 No. 17 Stoll open back inclinable.
 No. 6-A Toledo incl. back geared.
 Michigan s. s., dbl. Crank, 72" between housings.
 All sizes inclinable and honing presses.

SHEARS

48"x16 gauge Queen City, 12" gap.
 52"x10 gauge Niagara, 18" gap.
 52" Niagara, 16 gauge, 18" gap.

MISCELLANEOUS

Boring mill, 42" King vertical.
 Hack saws, 12x15 & 8x6 Racine; 6x6 Peerless.
 Keyseater, No. 1 Davis motor drive.
 Planer, 36x12 Gray, 2 heads.
 Shapers, 17 & 21" Smith & Mills & 24" G. & E.
 4" Landis pipe machine.
 11" Gleason bevel gear generator.

**A LARGE STOCK ALWAYS ON HAND—
 LET US HAVE YOUR INQUIRIES**

FOR SALE BY

Industrial Machinery Company, Inc.
2200-2300 Fletcher Av. Indianapolis, Ind.
 Turret lathe, No. 2 Acme full universal, m. d. 3-60-226.

FOR SALE BY

Davis Machinery Company
1-3-5 So. St. Clair St. Toledo, Ohio

Brake, 4"x3/16" Chicago, power, leaf type, m. d.
 Gear hobber, No. 12 Barber-C., dbl. over-a. rapid-trav.
 Milling machine, No. 3 Cin. univ., hi. p., div. hd.
 Milling machine, No. 3 Kemp Smith, univ. div. hd.
 Thread miller, 6"x12" Pratt & Whitney, belt drive.

FOR SALE BY

C. R. Daniels
1514 W. Capitol Drive, Milwaukee, Wis.

Horizontal boring, drilling and milling machine, No. 9
 Giddings & Lewis, 38" spdl. Table type, all standard
 dimensions and speeds. Motor driven with a. c.
 motor. Excellent condition. Price F.O.B. cars, \$3580.

FOR SALE BY

Ogden R. Adams
264-6 State St. Rochester, New York
Main 6374-5

1—Engraving machine, Gorton 1-D, arranged for motor
 drive. New pantograph and spindle.
 Reasonably priced.

FOR SALE BY

Bleser Machinery Company
209 N. Sixteenth St., - Springfield, Ill.

Lathe, 14"x6" Springfield, \$150.
 Lathe, 36"x18" L. & S., q. c., arranged m. d., \$1500.
 Slotter, 18" stroke, 30" table, \$125.
 Shaper, 32" American, arranged motor drive, \$325.
 Trip hammer, 25 lb. Little Giant, \$75.

FOR SALE BY

Surplus Stock & Machinery Co.,
620 W. Lake St., - Chicago, Ill.

Dicing machine, 25 ton Henry & Wright, roll feed.
 Lathe, 18"x8" Whitcomb Blaindell, q. c. g., m. d.
 Lathes, 18"x8" American, quick change gear.
 Lathe, 16"x6" Monotrol, timken bearing, mtr. in base.
 Lathe, 24"x14" Putnam, geared head.
 Shaper, 14" Gould & Eberhardt.
 Shaper planer, 26" openside, s. p. d.

Complete stock of metal working machinery.

Send us your inquiries.

USED AND REBUILT MACHINERY

FOR SALE BY

Lang Machinery Company

28th St. & A. V. R. R.

Pittsburg, Pa.

Air compressors, Ingersoll-Rand XB-2, 600, 888, 1200 & 1500 cu. ft. 100 lb. pressure, motor drive.
 Air comp., W N31 Sullivan, 350 c. i. syn. m. d.
 Air compressors, (2) Sullivan, 480 c. i. 100 lb. b. m. d.
 Air comp. 14"x12" Ing. Rand "E.R.-1", 464 c. i. Automatics, 2" cone, 4 spindle, m. d.
 Automatic, model "C" National Acme, 1 1/2" m. d.
 Drill cutter, 1" Landis, 1 1/2" 3" Acme, agl. hd., b. d.
 Boring mill, 24" Bullard, rapid production, m. d.
 Boring mill, 30" Bullard, threading attach., s. p. d.
 Boring mill, 42" Bullard, 2 swivel heads, s. p. d.
 Boring mills, 42" Bullard "New Era", m. d. (2)
 Boring mill, 42" Gisholt, 2 hds., r. p. t., m. d.
 Boring mill, 42" Bullard, rapid production, m. d.
 Boring mill, 52" Bausch, geared feeds, d. c. m., d.
 Boring mill, 64" Pond, 2 heads, belt drive.
 Boring mill, 96" Betts, rapid traverse, m. d.
 Boring mill, 10" Niles, 2 heads, belt drive.
 Boring mill, floor type, 3" bar Niles, m. d.
 Brakes, power, 7' 10 ga., 8' 12 ga., D. & K.
 Buffer and polisher, 7 1/2' p. Marschke, 220/3/60.
 Cranes, (2) 5-ton Shaw, EOT, 50' span, 3 mtr.
 Drill, heavy duty No. 1 Baker, 24" capacity 2 1/2", s. p. d.
 Drills, radial, 2 1/2" Cincinnati-Bickford, m. d.
 Drills, radial, 3" Fordick, s. p. d.
 Drill, radial, 3 1/2" Cincinnati Bickford, t. a., s. p. d.
 Drills, upright, 14" to 32", belt drive.
 Drills, 4-apd. Avey No. 2, b. b., m. d.
 Gear cutter, 48"x12" Gould & Eberhardt, s. p. d.
 Gear hobber, No. 18-H Gould & Eberhardt, s. p. d.
 Gear hobber, 96"x30" Gould & Eberhardt, m. d.
 Generator, 50 KW Westinghouse, 75 h. p., a. c.
 Grinder, disc, 18" Diamond, dbl. end.
 Grinder, disc, No. 6-20 Benley, a. c. m. d.
 Grinder, Sismatic No. 72-A3 Heald, m. d.
 Grinder, surface, No. 5 Grand Rapids, hyd. feed, m. d.
 Grinder, T. & C. No. 2 Norton, belt drive.
 Grinder, universal, No. 3 B. & S., m. d.
 Hammer, 100 lb. Bradley cushion helve belt drive.
 Hammer, power, 300-lb. Bradley upright helve.
 Keyseaters, M. & M. No. 0-1, No. 4-2 1/2, No. 5-3 1/2.
 Keyseater, No. 2 Baker, str. 24", cap. 3", b. d.
 Keyseater, Baker, 36" stroke, 3 1/2" m. d.
 Lathe, 12"x8" Prentice, geared head, q. c., s. p. d.
 Lathe, 16"x8" Hendey, q. c. g. t. a., b. d.
 Lathe, 20"x8" S.-B. & E., q. c. g., b. d.
 Lathe, 20"x24" Lodge & Shipley, q. c. g., b. d.
 Lathe, 21"x8" LeBlond, q. c. g., a. c. m. d.
 Lathe, 21"x10" LeBlond auto. mfg., belt drive.

Lathe, 24"x10" Bradford, q. c. g., t. a., b. d.
 Lathe, 24"x14" Schumacher & Boye, q. c. g., b. d.
 Lathe, 24"x14" Lodge & Shipley, q. c. g., d. b. g., b. d.
 Lathe, 24"x16" Lodge & Shipley, q. c. g., t. a., b. d.
 Lathe, 28"x14" Schumacher & Boye, p. c. g., t. a., b. d.
 Lathe, 36"x18" American, p. c. g., t. a., b. d.
 Lathe, 51"x32" New Haven, triple geared, motor drive.
 Lathe, roll, 54"x24" Standard, motor drive.
 Lathe, turret, 24" Steinel, 6 1/2" h. s., a. p. d.
 Lathe, turret 30" Steinel, grd. hd., 8" h. s., m. d.
 Miller, plain No. 14 Brown & Sharpe, grd. feeds, b. d.
 Miller, plain, No. 2 Cincinnati, tbl. 46"x10", b. d.
 Miller, plain, No. 24 LeBlond, tbl. 52"x11", b. d.
 Miller, plain No. 28 Ohio, table 52"x11", belt drive.
 Miller, plain, No. 3 Cincinnati, b. d.
 Miller, plain No. 4 LeBlond, table 72"x16", belt drive.
 Miller, plain, No. 24 Brown & S. tbl. 80"x17", b. d.
 Miller, vertical, model "B" Becker tbl. 57"x12", s. p. d.
 Pipe machines, Landis 1 1/2" to 2", belt drive, (2).
 Pipe machines, Nos. 304-B, 306-A 308-A Oster, m. d.
 Pipe machine, 8" Williams, 24" to 8" motor drive.
 Pipe machine, No. 114 Merrill, 24" to 12", motor drive.
 Planer, 30"x30"x8" Niles-Bemer-Pond, m. d.
 Planer, 36"x36"x10" Cincinnati, 2 heads, belt drive.
 Planer, 72"x72"x16" N.-I., P., 4 heads, rev. m. d.
 Planer, open side, 48"x30"x12" D. & H. 3 hds., m. d.
 Press, arch, No. 52 Toledo, str. 4 1/2", m. d.
 Press, No. 95 Bliss, dbl. crk., str. 3 1/2", m. d.
 Press, No. 83 Cleveland, stroke, 24", roller feed, m. d.
 Press, toggle, No. 34-A Bliss, stand.
 Presses, wheel, 100, 200 & 250-ton Hydraulic.
 Profilers, Nos. E3 and E4, Keller, motor drive.
 Punch & S., Cleveland, 36" thr. 1 1/2"-1 1/2", m. d.
 Punch 24" Deep Throat, b. d.
 Riveting hammer, No. 54 B high speed, m. d.
 Roll, bending, 7"x8", Pyramid Type, b. d.
 Saw, hack, 9"x9" Racine, 3 speed, m. d.
 Shapers, 16", 20", 24" & 28", belt or motor drive.
 Shaper, 24" Columbia, d. b. g., gear box, m. d.
 Shaper, open side, 26" Universal, Type A, m. d.
 Shear, No. 14 Canton alligator, 24" square, m. d.
 Shear, billet, No. FV-23 Pels, 3" round cap., m. d.
 Shear, rotary, No. 10 Quickwork, 14 ga. 60" throat.
 Shear, plate, No. 5 H. & J., 90"x1"-36" throat, m. d.
 Shear, plate, No. 52 Morgan, 8"x14", 24" throat, m. d.
 Slotter, 8" Betts, table 20" dia. b. d.
 Slotter, draw stroke, Baker, cap. 34"x38", m. d.
 Straightener, No. 1 Kane & Roach cap. 3" rd. m. d.
 Welders, 200 amp. Gen. Elec., 300 amp. Lincoln.

FOR SALE BY

S. M. Regar

Office & Warehouse, 2nd Ave. & 15th St.

Tampa, Florida

Boring mill, Bickford, horizontal 8-speeds, 9" bed, table 33x60".....\$ 600
 Broaching machine, LaPointe No. 3B, 56" stroke 400
 Crane, Dragline, Bearcat, 1/2 yard.....900
 Crane, Dragline, Northwest 1/2 yard Diesel power, 2800
 Crane, overhead, Link-Belt, 4-ton, with electric motors, no bridge.....600
 Lathe, Bement Miles, 36"x22" 6", loose change rest, raising block to 44".....850
 Lathe, Bridgeford, 27"x9", q. c., d. b. g.....550
 Millers, No. 7 Becker, Lincoln type, (4).....250
 Punch, multiple, Thos. Spacing Co. 1 1/2 thru 1 1/2, variable machine.....1000
 Riveter, Allen, Pneumatic, 19" reach, 94" gap.....90
 Shaper, Stockbridge, 24", cone drive.....600
 Shear, double angle, Morgan Mfg. 6x6x1.....500
 Slotter, Remont Miles, No. 487, 15 1/2" stroke, p. f.....700
 Welder, Wilson, 4 circuit, 150 amps.....300

FOR SALE BY

Reliance Machinery Sales Company

1405 Brighton Place, N.S. Pittsburgh, Pa.

Air compressor, 8x8 Chicago, 139 cu. ft.
 Angle shear, H. & J. double, 6x6x1, on turntable.
 Borer, car wheel, for 42" wheels.
 Boring mill, 51" Bausch, 2 heads, rapid traverse.
 Bulldozer, No. 9 W. W., 24" stroke, crosshead 16x39 1/2".
 Drill, radial, 6" Reed-Prentice, s. p. d.
 Grinder, No. 2 Brown & Sharpe surface, motor drive.
 Miller, No. 4 Cincinnati, plain, cone.
 Miller, No. 5 B. & S., plain, table 16"x54", cone.
 Miller, No. 6 Becker, 63" feed.
 Planer, 36"x36"x12" Cincinnati, 2 heads.
 Press, No. 2 Toledo, o. b. i., 4" stroke.
 Press, consolidated, s. a., 8" shaft, 6 1/2" stroke.
 Press, No. 82-C Toledo dbl. crank, 5" shaft, 4 1/2" wide.
 Presses, o. b. i., Nos. 4 & 5 Toledo.
 Shapers, 16", 20" and 24", various makes.
 Shear, open front bar, 7 1/2 ft.

What do you need? What have you for sale?

USED AND REBUILT MACHINERY

FOR SALE BY

The Warner Elevator Mfg. Company
2613-31 Spring Grove Ave., Cincinnati, O.

Niles radial drill, —54" arm, back geared, power rail elevating device, four-step cone drive. In very good condition. Low price for immediate sale.

FOR SALE BY

The Reeve-Fritts Company
28 N. Clinton St., Chicago

Boring machine, No. 1 Barrett, cylinder.
 Cut-off machine, 12" Peter's abrasive.
 Gear hobber, No. 1 Adams Farwell.
 Grinder, No. 2 Grand Rapids, universal.
 Grinder, No. 1 La Salle tool & surface.
 Press, No. 2 Rockford, o. b. l.
 Press, No. 3 Bliss (solid back).
 Screw driver, No. 2 Reynolds.
 Screw machine, 1" Cleveland automatic.
 Tapper, No. 1 Garvin, 1/2" vertical.

FOR SALE BY

Chas. E. Lowe Co.
174 Pearl Street Hartford, Conn.

8" Model G Gridleys, ser. 16903 m. d. (3)
 12" Model G Gridleys, ser. 10104 m. d. (2)
 18" Model G Gridleys, ser. 10149 m. d. (4)
 24" Model F Gridleys, m. d.
 Nos. 34, 452 New British chuckers.
 24" 44" Model "A" Clevelanda, b. d.
 24" 44" Model "A" Clevelanda, var. m. d.
 24" Model J, s. s. Gridley,
 No. 00, No. 0, No. 2 Brown & Sharpe.
 No. 53, No. 85 Acme, m. d.
 18" Model C 5 spdl., Acme's, m. d. (2).
 49 sets of round collets and pushers for 14" G Gridley.

FOR SALE BY

Joseph Hyman & Sons,
Tioga and Almond Sts., Philadelphia, Pa.
WORLD'S LARGEST STOCK

POWER PRESSES

No. 200C Toledo, gap, dbl. crank, tie rod, 6 1/2"—7" crank.
 No. 418 Bliss, double crank, tie rod, 7 1/2", crank 6"—6 1/2".
 No. SG 113 Ferracute, dbl. crank, tie rod 6 1/2", crk 5 1/2".
 No. 5C Bliss (2) double crank, tie rod, 5 1/2", crk 5 1/2".
 Bliss double crank, gap, grd. 7 1/2" crank, bed 9 1/2"x18".
 No. 138 Bliss, double crank, flywheel, 7 1/2", crank 5".
 Nos. 93B, 92D, 91C Toledo dbl. crank presses.
 Nos. 84, 55, 57, 57A, 59H Toledo, geared straight side.
 No. 58A Toledo, geared, straight side.
 No. 58G Garrison, tie rod, straight side, 8" crank.
 Nos. 35, 38B tie rod, 38C & 4 Bliss toggle presses.
 No. 144H Toledo and No. 3 Bliss toggle presses.
 No. 910H Stoll, toggle press, 7" 8" crank, 8 1/2" draw.
 No. 40 & 39B Bliss, Nos. 14 & 13 Toledo horning.
 No. 512 Niagara, geared, straight side, 8 1/2" shaft.
 No. 662 Toledo, 250 ton knuckle joint, coining.
 150 ton No. F.W.G. 52 Ferracute, 75 ton E.G. 51 Ferracute.
 500 ton American Can Coine, 751. No. E31, Ferracute.
 200 ton No. 59 Bliss, 250 ton Waterbury F. coining.
 100 ton No. 21 Bliss, 50 ton No. 3 Bliss coining.
 No. 3W Bliss wiring presses, (3).
 Squaring shears, various sizes.
 Gang slitter, 60", Bradcock, type H.
 These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.
 Rebuilt and Guaranteed.

FOR SALE BY

Porter-Cable Mche. Co., Syracuse, N. Y.
 Automatic chucker, 6A Potter & Johnston, rebuilt.
 Balancer, Gisholt dynamic, 24" swing x 40" length.
 Milling machine, No. 24 B. & S., 6' table, good cond.

FOR SALE BY

H. F. Wolnick Machinery Company
9 S. Clinton Street, Chicago, Ill.

Drill radial, Fosdick 4' geared box.
 Lathe, turret, No. 5 Foster a. p. d., wire feed, collets.
 Oil separator, 14 bushel.
 Power saw, No. 5 Marvel.
 Plain mill, No. 4 Cincinnati single pulley drive.
 Plain mill, 24x24x18 Osterlein cone head.
 Planers, 24x24x6' & 7'. (2)
 Press, No. 7 Bliss, 66" bet hous., 6" str., grd., t. r., b. d.
 Press, No. 2 R. & K., o. b. l. 2" stroke.
 Many other machines in plant being liquidated.

FOR SALE BY

General Machinery Corporation
140 Federal St., Boston, Mass.

Drill, Fairbanks 20" B. & T.
 Drill, Leland-Gifford floor, 10,000 r. p. m.
 Lathe, Sloan & Chase bench, 1/2" capacity.
 Miller, Becker No. 25, plain.
 Miller, Milwaukee No. 1, universal, cone.
 Planer, Gray 27' x5', c/s.
 Planer, Gray 27' x7', c/s.

FOR SALE BY

Wm. C. Johnson & Sons Machy. Co.
1211 Hadley St., St. Louis, Mo.

Air compressors, 15 in stock.
 Automatic, cone, 1", 1 1/2", 4 spindle, complete.
 Bolt threaders, 1", 1 1/2" & 2" Acme.
 Boring machine, 4 1/2" Betts.
 Boring mills, 6"—8" & 8"—12" Betts, 44" Niles.
 Die slotter, Garvin, 30" stroke.
 Drill, Allen 4 spindle, No. 3 taper, 12" overhang.
 Drill, No. 2 Fox, 6 spindles.
 Drill, Moline hole hog, 8-sp. No. 4 Morse taper.
 Drill, radial, 4" Drees and 4" Fosdick; 3 1/2" Mueller.
 Gear hobber, No. 2 Adams.
 Hammers, 300 lb. Baudry, 75 lb. Bradley, 50 & 100 lb.
 Little Giant.
 Lathe, 14"x6" Hendey belted m. d. taper attach.
 Lathe, 18"x8" Boye & Emmes, q. c.
 Lathe, 27"x16" L. & S. q. c. g.
 Miller, Cin. production type, 57"x11" table.
 Miller, Pratt & Whitney, spine.
 Miller, No. 4 LeBlonde universal cone drive.
 Pipe machines, 2"—4"—6"—8"—12".
 Press, No. 58 Toledo, double geared, 30"x30".
 Press, No. 79 Toledo, o. b. s. special, 3 1/2" stroke.
 Presses, Nos. 2, 3 & 4 Marshalltown.
 Presses, 3, hydraulic pump & accumulator.
 Press brake, 10' for 10 ga. Ohl.
 Press brake, 8' 6" for 14 ga. m. d., 95¢ new.
 Punch, Cleveland E. F. art jaw, 47" thr., with Lysholm spacing table, m. d., one-man control.
 Roll, corrugating, 24" dia., 12' removable dies.
 Roll, plate straightening, H. & I. No. 2, like new.
 Saw, 12"x12" Racine and Nos. 2 & 1 Marvels.
 Shapers, 12"—16"—20"—24".
 Sq. shear, No. 499 Bliss, 10".
 Punches, shears, bulldozers.
 Testing machine, 100,000 lb. Riehle.
 Large stock guaranteed electric motors. Any size.

USED AND REBUILT MACHINERY

FOR SALE BY

**Eastman Kodak Company
Kodak Park Rochester, N. Y.**

Lathe, Schmucker & Boye, 40" x14" q.c., dbg., ta. bd.
Planer, Pond, 40" x40" x12", 4 heads, bd.
Press, Bliss, automatic feed, 202-S, 4 die slides.

FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Boiler, 300 h. p. Edgemoor water tube.
Bolt cutter, 24" National geared head, motor drive.
Gear unit, Falk 124 H. C., Herringbone, 600 h. p., 300 to 1800 r. p. m.
Generators (2), 200 KW Westinghouse 3-60-2300-514 r. p. m. belted.

FOR SALE BY

**E. L. Klauber Machinery Co.
320-322 South Third St. St. Louis, Mo.**

Band saw, metal, 12x12 vise capacity, motor drive.
Heading and flanging machine, Cameron, No. 78 auto.
Centering machines, revolving and stationary hd. types.
Drills, 75; 1, 4, 6 spindle, radial—24" Carleton sensitive.
Grinder, No. 2 Brown & Sharpe cutter & reamer, m. d.
Hammer, Bradley 25 lb. upright strap.
Lathes, 16" Lehman, Monarch, Bradford b.g., q.c. g.
Lathes, turret, No. 0; No. 1; No. 2; No. 3 and No. 4.
Millers, 0Y Brown & Sharpe; No. 1 Kempamith plain;
Newton horizontal production—16x55 table, No. 1 Knight vertical.
Polisher and grinder, belt, 14" Peerless.
Screw machine, automatic, Cleveland 1-1/2 model A.
Shaper, 24" Cincinnati, universal tool room, m. d.
Spot welders, 20 and 25 K. W. National.

FOR SALE BY

Marr-Galbreath Machinery Company

Air compressors, 7x8" Chicago, NSB.
Air compressors, 9x8" Sullivan, W.G.-6.
Air compressor, 9" x5" Sullivan, m. d.
Blowers, (furnace) No. 2 Knight; No. 3 American.
Blower, pressure, No. 11-PB Am. 14375 cfm., m. d.
Boring mill, 30" Bullard vert., threading attach., b. d.
Brake, 8 x12 ga. Chicago, power, belted.
Brake, crimp and corrugating, 10" x16 ga. Keene.
Crimping and corrugating machine, 10" x16 ga. Keene.
Drill, radial 3/4" Bickford g. b., m. d.
Drill radial, 6" Amer. univ., g. b., m. d.
Drill, radial, 6" R. P. plain, g. b., r. p. d.
Drill, 3" radial, Dresser rd. swing table, t. a.
Drills, gang, 3 and 4 spindle, 1 to 4 MT.
Exhauster, No. 35 Buffalo, outlet 12x14", m. d.
Fan, ventilating, 24" American, m. d., 1/60.
Fan, 24" Sirocco, 4960 cfm. 4" wp., m. d.
Forging machine, 14" Acme, all steel, side shear.
Furnace, gas fired, Tate-Jones "GOF", I. D. 16 1/2" x11".
Furnace, T. J., 25x23x12" I.D. 17000 ft.
Grinder, No. 10 B. & S., plain, s. p. d.
Grinder, plain No. 10 B. & S., s. p. d., collet att.
Grinder, No. 21 Landis, plain, 10x30", c. s.
Grinder, tool & cutter No. 14 Cincinnati, plain.
Grinder, portable surface, No. 6-OA, motor, 3/60.
Grinder, univ. C. & R. No. 3 B. & S.
Grinding spindle, Exello No. 39, bracket 5002.
Hammers, 50 lb. Boas, No. 2, with dies, belted.
Hammer, 100 lb. Little Giant, belted.
Hammer, 200 lb. Bradley upright helve, motor drive.
Hammer, 300 lb. Beaudry "Champion", b. d.
Hammer, 400 lb. Bliss board drop (rebuild).
Hammer, 1000 lb. Chbg. steam drop, double frame.
Hoists, 10-ton Euclid, 3/60/220 (2).
Keyseater, No. 3 M. & M.
Keyseater, Morton, cap. 24"x24", s. p. d.
Lathe, 7x30", Dalton, type B-4, screw cutting.
Lathe, 15/22"x8" Sebastian cap bed cone.
Lathe, 16/32"x8" Fay & Scott, sliding bed, gap, cone.
Lathe, 18"x8" L. & S., d. b. g., Cullman, m. d.
Lathe, 20"x8" LeBlond q. c. g., 5-step cone.
Lathe, 20"x8" LeBlond q. c. g., t. a., 5-step cone.
Lathe, 20"x12" American geared head, m. d.
Lathe, 22"x12" Rahn-Larmon, pl. change gears, t. a.
Lathe, 27"x10" L. & S., 5-step cone, q. c. g.
Lathe, 24"x20" L. & S., selective hd., m. d.
Lathe, 24"x20" L. & S., selective head, m. d., t. a.
Lathe, 26"x10" Wolcott, q. c. g., d. b. g., 2 1/2" h. a.
Marking machine, No. 3 Noble & Westbrook.
Milling mach. univ. No. 3 Kempamith, cone.
Milling machine, univ. No. 4 B. & S. cone.
Milling machine, pl. No. 3 Cincinnati, cone.
Nailing machine, No. 6 Morgan, 8-track, m. d.
Nibbling machine, No. 1 Campbell, 6" thr. 3/16".

57 Water St., Pittsburgh, Pa.

Nut runner, No. 4 B. & D. 3", motor 110 v.
Pinion cutter, No. 3 S. & C., auto., 1" x1".
Pinion cutter, No. 3 Sloan & Chase, capacity 1x1".
Pipe machine, 4" Williams, cap. 4" to 4", m. d.
Pipe machine, 18" Wieland "Standard", m. d.
Planer, 26"x26"x8" Niles, 1 hd., belt m. d.
Planer, 30"x30"x8" Cincinnati, 1-rail, 1-s. b., m. d.
Presses, 6 & 7 Bliss d. c., t. r., b. g.
Presses, No. 21 Bliss o. b. i., stroke 1", m. d., (2).
Presses, No. 18 Bliss o. b. i., 1 1/2 & 2" stroke.
Press, hyd. vert., 30-ton Lourie, 18" between posts.
Press, foot, Lewistwaite, wt. 400 lb., (2).
Press, horn, No. 164 Bliss, plain, stroke 1 1/2".
Presses, No. 22 Bliss o. b. i., stroke 2 1/2" (welded).
Presses, United, 56-ton o. b. d., str. 1 1/2", shear blade, m. d.
Press, o. b. i. No. 9 Thomas, 14" str., 650 lb. (new).
Press, o. b. i. No. 3 Perkins, pl. str., 1 1/2".
Press, o. b. i. No. 1 Thomas, 2" stroke, m. d.
Press, punch, P-2, Ferracute, m. d.
Press, sgl. crank, 50" Toledo, str. 5".
Press, wheel, 60-ton W. S., 24"x8".
Press, wheel, 200-ton, 93"x16", pump, m. d.
Punch & shr., comb. No. 5 Buffalo, hand, cap. 1 1/2"x1".
Punch & shear, S. E., 18" tht. 1 1/2"x3"; No. 3 L. & A.
Riveter, No. 103 Grant, motor drive.
Riveters, No. 3-A, and 120 Grant, m. d.
Riveter, No. 5-A, high speed, cap. 8", m. d.
Rolls, 30"x8" United, 2-rolls (for leather).
Saws, metal, 4x4" Napier, m. d., (2).
Screw machine, turret No. 1 Garvin, w. f.
Shaper, 15" Blount, (planer drive).
Shaper, 20" Kelly, b. g., crank, cone.
Shaper, 21" Averbek, b. g., cone.
Shaper, 24" Milwaukee b. g., V-rim.
Shaper, 24" American, gear box, motor 3/60/220.
Shaper, 28" American b. g., gear box, m. d.
Shear, alligator 14", 8" blade.
Shear, alligator, No. 46 Beloit, cap. 1".
Shear, B. 36 Stanley Unishar, cap. 1", m. d.
Shear, O. 36 Stanley Unishar, cap. 1 1/2", m. d.
Slotter, 34" Rhodes, bench, rotary table.
Speed reducers, 1 h. p., 96:1; 3 h. p., 41:1.
Sprue cutter, No. 172 Bliss, belt.
Tapping machine, 3/4" Pratt & Whitney, b. d.
Testing machine, 1000 lb. Olsen hyd., hand.
Testing machine, 100,000 lb. Riehle, m. d.
Tiering machines, 600 and 1600 lb. Economy, hand.
Tumbling barrel, No. 2 Baird, tilting.
Tumbling barrel, 14x18x20", Hanson-VanWinkle.
Turret lathe, 24"x14" Gisholt.
Turret lathe, 24"x36" Acme, s. p. d.
Turret lathe, 18"x36" Springfield, Fox Monitor.
Upsetter, 14" Acme, all steel.
Welder, arc, 280 amp., a. c. Hampton (new).

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Acme Equipment Company

128 So. Clinton St., - Chicago, Ill.

Apron brake, Chicago steel power, 4 ft., 4" cap.
 Drills, radial, 2 $\frac{1}{2}$, 3, 3 $\frac{1}{2}$, 4 ft. arms.
 Grinder, Gardner 53" horizontal, b. b., m. d.
 Lathes, Rockford q. c. g. 14" x 6", So. Head 13" x 5".
 Milling machines, No. 1 Wisc., No. 1B Milwaukee.
 Presses, punch, o. b. i. No. 00, 0, 1, 2, 3, 4.
 Shapers, 14, 16, 18, 20, 24" stroke.

FOR SALE BY

Wigglesworth Machinery Co.

199 Bent Street Cambridge, Mass.

Boring mill, 3" bar Lucas.
 Boring mill, 24" Bullard, side head.
 Drill, 4-spindle Leland-Gifford.
 Eyelet machine, Nos. 56 and 57 Waterbury-Farrell.
 Grinder, No. 14 Landis, universal.
 Grinder, 14" model B, Pratt & Whitney, m. d.
 Grinder, No. 33 abrasive, m. d.
 Grinder, No. 16 Blanchard, m. d.
 Grinder, No. 2 Brown & Sharpe-Reid.
 Grinder, 18" x 36" Norton.
 Lathe, 16" x 12" Rockford, q. c. g.
 Lathe, 18" x 12" Rockford, q. c. g.
 Miller, No. 3A heavy Brown & Sharpe univ., m. d.
 Miller, No. 4 Knight-jig borer-m. d.
 Planers, 42" x 42" x 10" Detrick & Harvey (2).
 Press, No. 2 V & O, back geared, m. d.
 Press, No. 21B, Bliss inc.
 Radial, 4" American triple purpose, m. d.
 Radial, 4" Cincinnati-Ricard, s. p. d., enc. head.
 Spine millers, 6" Taylor & Fenn (4) m. d.
 Spine miller, 4" Pratt & Whitney.
 Turret lathes, No. 2A & No. 3A Warner & Swasey.
 Turret lathes, Nos. 4, 5 & 6 Warner & Swasey, gd. hd.
 Turret lathe, No. 3 Foster timken bearing, m. u.
 Turret lathe, No. 4 Brown & Sharpe, wire feed.

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The Nutmeg State Machinery Corp.

1041 State St., - New Haven, Conn.

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 Grinders, Head No. 20-8" and 16" rotary.
 Grinder, No. 10 Brown & Sharpe s. p. d., plain.
 Grinders, Norton 6x32 and 10x36 plain.
 Headers, No. 00 Manville, d. s. s. d., No. 00 s. s. s. d.
 Header, Wat. Far. No. 0, d. s. s. d.
 Lathe, Hendey 20" x 12", yoke head.
 Millers, Cin. Nos. 2 and 3 s. p. d., plain.
 Miller, Cincinnati No. 3, cone, plain.
 Miller, No. 1, Cincinnati universal complete.
 Millers, Superior slot millers, m. d. (like new) (3).
 Presses, No. 38-A toggle Bliss, No. 744 Bliss.
 Press, Bird No. 2 heavy, cut and carry.
 Press, Wat. Farrel, 180 ton knuckle.
 Press, No. 64, Cons. s. side, geared.
 Rolling mill, 10" x 8", Wat. Farrel.
 Rolling mill, 4" x 7", Buffalo.
 Shaper, P. & W. 6" vertical, m. d.
 Shaper, Potter & Johnson 15" m. d., univ.
 Shapers, Springfield 18" m. d., (2).
 Shapers, American 24" s. p. d.
 Shaper, Cincinnati 24" m. d.
 Tappers, Anderson dial feed, m. d.
 Tappers, Hart & Heg. high speed, dial feed.
 Many other lathes, presses, shapers, etc.

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Standard Machinery Co.,

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Automatic, 14" Gridley, model F.
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 Boring mill, 24" Lucas horizontal.
 Drill, 28" Barus power feed back geared.
 Drill grinder, Sellers 3" capacity.
 Grinder, No. 24 Walker surface.
 Grinder, No. 4 Badger disc, motor drive.
 Lathes, Porter-Cable Mfg. (10).
 Miller, model C-1 Becker heavy vertical.
 Saw, 6" Hieley cold metal.
 Shaper, 24" Hamilton.

FOR SALE BY

Russell Machine Co.

438 Oliver Bldg. Pittsburgh, Pa.

Boring mill, Bullard, 42" New Era type.
 Boring mill, 42" Gisholt, 2 heads, m. d.
 Boring mill, 18" Niles vertical.
 Gear hobber, No. 184 Gould & Eberhardt, s. p. d.
 Hammer, 5000lb. double frame NRP steam.
 Lathe, 26" x 13" Chard, hvy. duty, q. c. g., t. a.
 Lathe, 26"-48" x 14" McCabe 2-in-1 j. c. g., b. d.
 Lathe, 32" x 23" Pond triple geared.
 Lathe, turret, 30" Steine, 8" b. a.
 Pipe cutting and threading machine 6" Merrill.
 Planer, Cincinnati 36" x 36" x 16" table.
 Press, No. 5 Bliss type, 2" stroke, b. d.
 Press, wheel, 200-ton Niles, b. d.
 Punch-press Cleveland gr. roller feed, 100 ton pr.
 Saw, back, Racine 9" x 9", m. d.
 Shaper, 24" Gould & Eberhardt.
 Shear, alligator, United, cap. 8" square.
 Shear, plate, No. 5 H. & J., cap. 90" x 8", m. d.
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 Upsetting machines, 24, 31, 4 and 5" Ajax iron bed.

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Automatics, 3/4", 7/8", 2 1/4" single spindle Cleveland.
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 Crankshaft Grinder, 16" x 48" Norton double end drive.
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 Drill, No. 4 Bausch 28-spindle multiple.
 Drill, 4"-11" column Amer. pl. radial, gr. box, s. p. d.
 Gear hobber, No. 1 Schuchardt & Schutte c. s. belt dr.
 Gear shapers, type 624 and type 6 Fellows.
 Grinder, No. 12 Bryant int. with 220 v., 3 ph., 60 cy. mtr.
 Grinder, Gardner No. 1, univ. with 220 v., 3 ph., 60 cy. motor on scindie pump and piping with pan.
 Grinder, 12" x 36" Landis, complete.
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 Press, No. 812 Niagara straight side, 6" stroke.
 Radial, 2'-8" column American plain, gear box, single pulley drive.
 Screw machine, No. 1 W. & S. hand, automatic chuck, bar feed, countershaft drive.
 Screw machine, No. 2 B. & S. hand feed, automatic bar feed, countershaft drive.
 Simplimatic, Gisholt, practically new.
 Turret lathe, 24" Gisholt double bk. grd., 4-jaw chuck.
 Turret, 24" x 26" Greenlee flat, with automatic chuck.

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Bending roll, 30"x14" Southward, drop end housing.
 Chuck, magnetic 12" wide by 8" long, Walker, 110 v. d.c.
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 Grinder, No. 14 Pratt & Whitney b. b., vert. surface.
 Grinder, No. 16 Blanchard high power vert. sur., m. d.
 Grinder, Mummert-Dixon 3 wheel tool grinder.
 Hammer, No. 4-B Nazel, motor drive, a. c.
 Lathe, 17"x8" LeBlond heavy duty, 3 step cone, d. b. g.
 Lathe, 15"x8" Lodge & Shipley, geared head.
 Lathe, 30"x8" Cleveland, geared head.
 Lathe, 26"x14" Bridgeford, geared head, m. d., taper.
 Lathe, turret 24"x24" J. & L., steel head, bar equip.
 Lathe, turret 3"x36" J. & L., bar and chucking equip.
 Miller, plain No. 24 B. & S., table work surf. 72"x134".
 Miller, No. 1 Cincinnati plain, cone drive.
 Millers, No. 2 Cincinnati plain, high power, s. p. d.
 Miller, 45" Cincinnati automatic duplex, motor drive.
 Multiple punch, No. 5 H. & J., 84" between housings.
 Pipe machine, 4" Williams, motor drive.
 Saw, 6" Racine power hack saw.
 Shears, squaring 10"x14" and 12"x16" Ohl.
 Shear, squaring 10"x16" Loy & Nawrath, arr. m. d.

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Sheet metal working machinery, hand and power.
 All types of new and reconditioned equipment.
 Apron brakes, press brakes, shears, folders.
 Bending rolls, corrugating rolls, forming rolls.
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Boring mills, 64" Niles vert., rap. trav., m. d.
 Drill, multiple spdl., No. 30 Natco, m. d., 20" round hd.
 Gear cutter, 110" Newton, motor drive.
 Grinder, Cincinnati 24", face mill, motor drive.
 Keyseater, No. 20 Catlin, m. d.
 Lathe, 60"x25" Gleason, motor drive.
 Lathe, 42"x18" Pittsburgh, quick change gear.
 Planer, 72"x72"x32" N. B. P., 4 heads, rev. m. d.
 Planer, 96"x72"x26" Pond, 3 heads, m. d.
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Air compressors, 30 to 2500 cubic feet.
 Air comp., portable gas I-R 10 cu. ft.
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 Bolt cutters, 2" & 3" Acme, b. d.
 Boring mill, 42" Bullard, 2 heads.
 Boring mill, 60" Betts, 2 heads, belt drive.
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 Drills, 4 spindle Allen, No. 3 m. t., s. p. d.
 Drills, multiple 25 spindle No. 30 Natco.
 Drills, upright 10" to 36".
 Engine, gas, 20 horse power Bessemer.
 Flanger, McCabe, 4" capacity, dies.
 Flanger, No. 208 Niagara, 10 Ga. b. d.
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 Gear cutters, 11", 18" & 24" Gleason.
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 Grinders, centerless Heim, m. d., 220/3/60.
 Grinder, drill, No. 21 Oliver, 14", m. d., 220/3/60.
 Grinder, knife 10" Bridgeport, m. d.
 Grinder, roll, Farrel 28"x78".
 Grinders, D. E. 2-3 & 5 h. p., 220/3/60.
 Grinder, T. & C. No. 1 & No. 2 Cincinnati, m. d.
 Grinder, disc, No. 8-20 Besly, belt drive.
 Grinder, disc, No. 4 Gardner, motor drive, 220/3/60.
 Groover, No. 278-A Niagara, 6" 16 ga. motor drive.
 Hammers, 50 lb., 75 lb., 100 lb., 200 lb. Upright.
 Hammer, power, 100 lb. Bradley cushion helve.
 Hammers, Nos. 2-B, 3-B, 4-B, 6-B, Nazel.
 Hammers, steam, forging & drop.
 Keyseater, No. 2 Mitts & Merrill, belt drive.
 Lathe, 20x12 S-B-E., t. a. q. c. g., b. d.
 Lathe, 26"x12" Putnam, q. c. g., d. b. g.
 Lathe, 42"x16" Schumacher Boye, q. c. g., belt drive.
 Lathe, wheel, 78"x94" Bement, motor drive.
 Lathe, spinning 32" belt drive.
 Lathe, turret, W&S No. 2A & No. 3A s. p. d.
 Lathe, turret, 17x8 LeBlond double back gear 14".
 Locomotive, gas, 6 ton Milwaukee, 36".
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 Miller, vertical No. 2 Knight, b. d.
 Miller, vertical No. 6 Becker, motor drive.
 Mixers, Sprout-Waldren, batch & liquid.

Pittsburgh, Pa.

Pipe machine, 2", 4", 6", 8" Landis-Oster-Williams.
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 Press, forging, 150 ton United, steam hyd.
 Press, wheel 150 ton Caldwell, 42", b. d.
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 Presses, O.H.I., No. 19 Bliss & No. 4 Toledo, 3' str.
 Press, No. 55 Toledo, bed 20x19.
 Press, double crank No. 5 Bliss, 2" stroke, b. d.
 Press, gap, No. 74 Bliss consolidated 44" stroke.
 Press, screw, No. 87 Niagara, hand power.
 Press, 6 spindle, Waterbury-Farrell.
 Press, arch, No. 30 Bliss, roll feed, b. d.
 Punch, E.F. Cleveland, 36" throat, 14" thru 1".
 Pumps, centrifugal 6", 4", 1" motor drive.
 Riveters, air, hammer, spinning.
 Rolling mill, cold 9"x18" motor drive.
 Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.
 Saw, cold, 48" Newton motor drive.
 Shapers, 16", 20", 24" & 36" Gould & Eberhardt.
 Shears, alligator, 14", 2", 3", 4" & 6".
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 Shear, 60"x16" Niagara, 15" gap, b. d.
 Shear, 8 x14 ga. Ohl, m. d., 110/220/1/60.
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 Shear, circle No. 3 Bliss, 40"x20 gauge.
 Shear, Guill., No. 5 H. & J., 48" rd., m. d.
 Shear, 10"x8" Bliss, holddown, b. d.
 Shear, plate, 60"x31" Pels.
 Shear, 36" & 42" Niagara, 18 ga. b. d.
 Shear, rotary 24" throat capacity 14", m. d. 220/3/60.
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 Slitter, gang, 36" Yoder motor drive.
 Slitter, gang, 36" Braddock, belt drive.
 Slotters, 6" & 24" Newton.
 Straightener, 12"x3" Shuster, b. d.
 Straightener, AS & TP 12"x3/16", belt drive.
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 Straightener, 48" Aetna-Standard, 17 roll 34" m. d.
 Straightener, No. 2 K. & R., 14" square, m. d.
 Straightener, No. 5 K. & R., 24" square, belt drive.
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Friction Saw, Ryerson No. 3½ with 75 h. p. motor, 52" diam. blade, cap. 24" "T" beams, 8"x6"x1½" angles, 3½" square bars, 4" round bars. Weight about 10500 lbs.—good condition as taken from service..... **\$2,000.**

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\$1.00 additional, for swivel vise.

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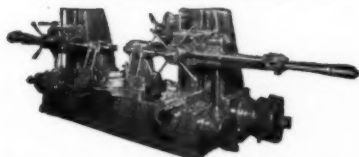


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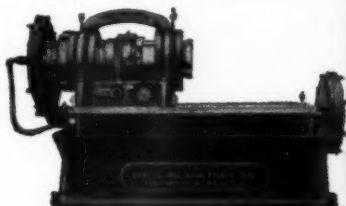
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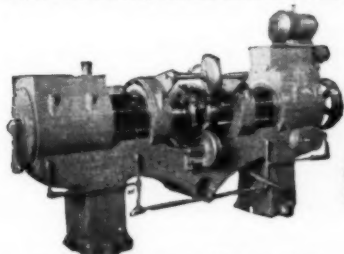
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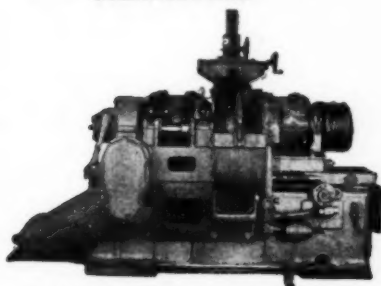
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**Davis & Thompson "Rotomatic"
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- 1—No. 35 Rochester F.T. Boring Mill, with duplicating attachment.
- 1—42"x12' Liberty Open Side Planer.
- 1—36"x36"x18' Gray Planer, 2 heads.
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- 7—6A Potter & Johnson Lathes.
- 5—Potter & Johnson Unimatic Lathes.
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- 1—No. 3 LeBlond Plain Milling Machine.
- 1—27" will swing 30"x12' LeBlond all geared head Engine Lathe.
- 1—No. 4 W. & S. Univ. G. H. Tur. Lathe.
- 4—No. 11 G. & L. Terom. Int. Grinders, m.d.
- 3—No. 12 G. & L. Terom. Int. Grinders, m.d.
- 1—No. 11 B. & S. Motor Drive Grinder.
- 5—No. 12 Browne & Sharpe Pl. Grinders.
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- 1—No. 18H Gould & E. Gear Hobber.
- 1—Gould & E. No. 36 S T Gear Rougher.

- 2—No. 3 Barber-Colman Gear Hobbers.
- 1—Nasco No. C-13-H Hyd. Multiple Drill.
- 1—No. 14 Nasco Mult. Drill; 12—14 O. D. spindle.
- 3—No. 310 Baker Drills.
- 1—No. 416 Baker Drill.
- 1—84" Diamond Face Grind., arr. for M. D.
- 1—11"x14 Ga. O. D. Power Square Shear.
- 1—34" National Acme 4-spindle Automatic.
- 2—7/8" Model "G" Gridley Automatics.
- 5—Cleveland Automatics.
- 1—3" Model "B" Nat'l Acme 4-sp. Auto.
- 1—Ing. Rand Imp. type No. 10 Air Comp., Size 16x10x14 with 100 H. P. motor, cap. 750 c. f.
- 1—1 1/2" Acme Steel Bed Upset., arr. for M.D.
- 1—3" Acme Steel Bed Upset., arr. for M.D.
- 1—Model "IB" Cleveland S. E. Punch, 36" Throat.

THESE ARE BUT A FEW OF THE MANY ITEMS WE HAVE TO OFFER

RIVERSIDE MACHINERY DEPOT
255 St. Aubin Avenue. - - - - - Detroit, Mich.

DEPENDABLE

MOREY

VALUES

BORING MILLS

- N. B. P. 6 1/2" bar horiz.
- Landis No. 35, 3 1/2" bar, horiz.
- Cleveland 2 1/2" bar horizontal.
- Bullard 24", 36" N. E. vertical.
- Gisholt 42" vertical 2 heads.
- Colburn 60" vertical 2 hds.
- N. B. P. 72" Vert. 2 heads.
- Betts 6—10" ext. type vertical.
- Bullard 8" Mult-Au-Matic; 6 sp.

LATHES

- Amer 42"x35' Engine Lathe.
- Bridgeford 36"x60' boring.
- Putnam 36"x28' g. h., nearly new
- Reed Prentice 24"x18', 24"x20'.
- Lodge & Shipley 24"x12' cone.
- Le Blond 25"x16' cone.
- Lodge & Shipley 16"x8' grd. hd.
- Hendrie 14" to 24"x36" to 12'.
- 200 other lathes—all sizes.

PLANERS

- Cinc. 30"x30x10'; 2 hds. P.R.T.
- Liberty 44x42x18'; 4 heads.
- Cleve. 48"x48"x16'; 4 hds. o. s.
- American 36"x36"x20'; 3 heads.
- W. & P. 60"x42"x19'; 4 heads.
- Niles 60"x60"x12', 2 heads.
- Niles 72"x72"x14', 2 heads.

DRILL PRESSES

- Nasco Nos. 12, 13 & 22 mult. sp.
- Nasco C11 drill, mechanical fds.
- Nasco C13H drill, hyd. feeds.
- Pratt & W. No. 12 rect. head.

DRILL PRESSES—RADIAL

- Cinc. Bick. 3 1/2', 4', 5' plain.
- Reed Prentice 3' plain.
- Baush 6' plain.
- Western 6', 7' plain.
- American 6' univ.

GRINDERS

- Pratt & Whitney No. 14 surface.
- Heald No. 20, No. 22.
- Heald Nos. 55, 60, 65, 70 inter.
- Landis 6x18, 10x24, 12x36 pl.
- Norton 10x36, 14x72 plain.
- Landis 16x32, 16x48 crankshaft.
- Norton type B-81, 14x30—36".
- B. & S. No. 1, No. 3 univ.

MILLING MACHINES

- Lees-Bradner No. 8 Thread.
- B. & S. No. 2A univ.
- Brown & S. Nos. 2 & 3 univ.
- B. & S. Nos. 2B, 3B, plain.
- Brown & Sharpe No. 5 Vertical.
- Hanson & Whitney Thread.

- Cincinnati 18", 24", 48" auto.
- Ing. 24x24x12', 36x36x12', 3 hd. adj. rail.

AUTO. SCREW MCHES.

- Brown & Sharpe No. 2 auto.
- Cleveland 2", 2 1/2" mod. A auto.
- Gridley 3/4", 5/8", 1 1/4", 1 3/4", 2 1/4".

GEAR CUTTING EQUIPT.

- Barber C. Nos. 3, 12 g. hobbers.
- Brown & S. No. 13H gr. cut.
- Gould & E. 18H, 36H.
- Cleveland 8 spindle spline hob.
- Gleason 10", 15" spiral bevel.
- Gleason 24" bevel gear.
- Fellows No. 8B burnisher.
- Fellows Nos. 6, 61, 515, 7, 71, 7A.
- Lees Bradnerlapper, cap. 1 1/2x8"

MISCELLANEOUS

- Nazel No. 8 Hammer.
- Sellers 42" wheel lathe.
- Riehle 50,000 lbs. Testing Mch.
- Niles 24" Slotter.
- P. & W. 10" Vertical Shaper.
- Pels No. 16 com. punch & shear.
- Pels No. 80 gap shear; 7/8" cap.

MOREY MACHINERY COMPANY

410 BROOME STREET.

NEW YORK, NEW YORK

BORING MILLS, Horizontal

3" bar Fiedick Table Type.
4" bar Gisholt, knee, M.D.
4½" Univ. No. 44 Tri Way.
5" bar Niles Floor type.
5" Barrett No. 2 Cyl. Borer.
8" bar Beaman Smith, Floor

BORING MILLS, Vertical

7'-10' Betts Ext. Type.
72" Pond, AC, MD.
60" & 51" Bullards (2).
30" Colburn, 1 turret hd.
60" & 53" Colburn P.R.T.

DRILLS, Radial

7' American Univ. Gear Box.
6" Amer. Univ. & Plain.
6" Mueller, Gear box, M.D.
6" & 5" Cincinnati. Hvy.
3' American, Sensitive.
2, 4 & 6 Spindle Allens.
4 Spindle No. 2B Edlund.
4 Spindle Kokomo, No. 3 M.T.
No. 22½ Foote Burt.

GRINDERS

8"x54" Fitchburg Pl., m.d.
10"x36" Landis Plain (3).
12"x32" No. 2 Landis Univ.
12"x36" Landis Plain.
6"x32" Norton Plain.
14"x72" Norton Self Cont.
16"x50" Norton Self Cont.
No. 6 Bryant Chucking
18" Bealy No. 26 Disc.
18" Badger No. 220 Disc.
24" Gardner No. 4 Disc M.D.
No. 16 Blanchard, Floor, M.D.
No. 11 Landis Tool & Cutter.
No. 55, 60 and 65 Head Cyl.
14" P & W Surface M. D.
No. 2 B. & S. Surface M. D.
No. 13 B. & S. universal.
Heim, Centerless.

LATHES

14"x6" Cisco t.s., draw-in.
14"x6" Monarch, q.c.g., cone.
16"x8" Greaves K., Q.C.G.

LATHES (Continued)

16"x8" Hendey Cone, T.A.
16"x8" Prentice, Grd. Hd.
16"x10" L & S Cone T.A.
16/18"x8" Am., Q.C.G., Cone.
18"x8" Advance, Q.C.G.
18"x8" Lodge & S. Cone.
19"x8" LeBlond, Cone.
20"x8" Lodge & S. Cone.
20"x12" Greaves K., T.A.
20"x10" Greaves Klusman.
22/24"x8" Lodge & S., cone.
24"x12" Putnam Q.C.G., cone.
24"x19" American L. C. G.
26"x18" Pond Grd. Hd., M.D.
28"x12" Boye & Emmes.
30"x18" Bridgeford turning.
32"x14" Boye & Emmes, Cone.
32"x17" Ffield, triple grd.
36"x22" Schumacher Boye.
36"x32" Putnam Grd. Hd.
42"x20" L. & S. Cone, Q.C.G.
48"x36" Fified, m.d.
60"x25" Gleason hvy. duty.

MILLERS

No. 2 Cincinnati Pl., Cone.
No. 3 Cin. Univ., Cone.
No. 4 Cin. Hi Power Pl. P.R.T.
No. 4G LeBlond S.P.D.
No. 2M Cin. Vert., Mtr. in B.
Nos. 5, 5C, 6 & B Beck, Vert.
Model C Becker Vert. S.P.D.
Model CS Becker Continuons.
No. 2 Cin. Univ. Grd. H. M.D.
No. 1 B B & S, S.P.D.
No. 2 B & S Univ., Cone.
No. 3 LeBlond Univ., Cone.
24"x24"x12" Ingersoll Adj.
Rail Planer Type.

PLANERS

72"x72"x18" D&H Openside.
48"x60"x12" Gray, 2 Hds.
48"x48"x12" D&H Openside.
48"x36"x10" Gray, 2 Hds.
36"x36"x8" D. & H. Openside
30"x30"x9" Powell, 2 Hds.
24"x30"x6" Cincinnati, 2 Hds.
30" Newton Rotary, M.D.
30"x30"x10" D. & H. Openside.
24"x8" Gray; 24"x7" Niles.
24" Lynd Farquhar Openside.

TURRET LATHES

1½" & 2" P. & W's. (2).
3¼"x36" Cincinnati. Acme, Grd. Hd.

TURRET LATHES (Continued)

No. 5 Foster, 1-13/16" bar.
24" Gish., 6¼" H.S., A.C., M.D.
24" Gish., 6¼" h.s., 2 cone.
28" Gisholt M.D.
24" Steine, 6¼" H.S., M.D.
2¼"x24" & 3"x36" J. & L.

MISCELLANEOUS

Automatic, 24" Gridley, 1 Sp.
Billet Breaking Mach., Ajax.
Bolt Threader, 1½" Landis.
Broach, No. 3B LaPte. M/D.
Chucking, Nos. 34 & 23 N. B.
Flanger, ½" McCabe Pneu.
Gear Cutter, 110" Newton Spur
Gear Planer, 24" Gleason.
Gear Hobber, 6" Pfauter.
Gear Shaper, No. 61 Fellows.
Gear Generator, 11" Gleason.
Hammer, 2B Nazel M.D.
Header, 1½" Acme Rivet.
Header, 2" Acme, Steel.
Keyston, No. 1 Bak., No. 1 Dav.
Keyston, Nos. 2, 3 & 4 M&M
Nibbler, No. 3 Gray 1½", 36".
Pipe Mach. 4" Landis, M.D.
Pipe Machine, 8" Williams.
Pipe Machine, 12" Saunders.
Pipe Mach., 12" Curtis & C.
Pipe Mach., 2" Bignall Keeler.
Press, 400 ton N.B.P. H. Hy.
Press, No. 81 Z & H Percussion
Press, No. 61 Spec. V & O.
Press, No. 74 Bliss Consolidat.
Punch & Shear No. 47 PBC B.
Punch 54" H & J No. 2 D.E.
Punch, 36" Whit, 1½"x1½".
Rolls, 8"x1½" H&J No. 2.
Rolls, 14"x1½" Wickes.
Rolls, 20"x½" H & J No. 6.
Rolls, Angle, 2½"x2½"x1½".
Saw, 9"x9" Peer. Univ., M/D.
Saw, 9"x9" Peer. Hack, M/D.
Saw, 6" Avey Milland.
Saw, 6" Gorton No. 2B Inter.
Saw, 12"x15" Racine M/D.
Shapers, 24", 20" & 16" Cincinnati.
Shaper, 16" American, Cone.
Shaper, 24" Gould & Eberhardt
Shapers, 24" & 20" Queen
City M.
Shaper, 16" Ohio, M/D.
Shaving Mach. P. & W. Vert.
Shear, 30" Cleveland, No. X.
Shear, 156"x1½" United, 36" g.
126"x1½" Amer., 22" Gap.
126"x1½" Niagara, 18" gap.
Slotter, 6" Pratt & Whitney.
Slotter, 15"-18" Dill.
Slotter, 24" Newton, M/D

BENNETT-RAFKIN MACHINE TOOL CO., Inc.

Offices: 30 CHURCH ST., NEW YORK CITY

AUTOMATICS: B. & S. No. 2-G; No. 0; No. 00; Cleveland Model A; 1½".
COMPRESSORS, 500; 268; 156; 90; 68; 42".
DRILLS, Radial: 6' N. B. P. Univ.; 4' Bickford; 4' Cin-B; 2½'—3' Foadick; Avey, Sipp, H&W; Allen—High Speed; B. B.; Sens. 1, 2, 3, 4 sp.
GRINDERS: Internal No. 70 Heald; 14x50 Norton Pl.; 12x36 Landis Univ.
TURRET LATHES: No. 2-A Warner & S.; J & L 3x36 Chucking; J & L 2½x24 bar; Gisholt

21x3½. M.D.; No. 6 Foster Univ.
PRESSES: Bliss No. 1 Toggle; Bliss No. 306 Geared; S. S. Tierod; V. & O. No. 5 Geared; No. 21½ Bliss, Grd.; O. B. I.; V. & O. No. 2½; No. 1; O. B. I.
BLISS AUTOMATIC GANG PRESS: No. 103S; makes 8 operations simultaneously; 180 finished blanks per minute. Roll Feed.
SPOT WELDERS, 10 to 90 K. W.
MOTORS—All Sizes; large stock.
KEYSEATER, Baker No. 3, 72" capacity.

FALK MACHINERY COMPANY

18 Ward Street, Rochester, New York

MACHINE TOOLS FOR SALE

Centerless Grinding Machine, No. 2 Cincinnati, arranged for motor drive, in perfect condition, equipped for straight through work.

Universal Milling Machine, No. 3 Ryerson Conradson high power, single pulley drive, all geared feeds and speeds, complete with universal spiral dividing

head & vertical milling attachment, working surface of table 53"x12".

Gear Shapers, No. 6 Fellows for external and internal spur gears, max. dia of external gears 35", (2).

Automatic Screw Machines, No. 0 Brown & Sharpe, hole through largest feeding finger ½", (2).

LAURENS BROS.

Peoples Bank Bldg.,

Cincinnati, Ohio

15,000 STACKING BOXES



Illustration shows boxes stacked 3 high

Excellent Condition.

24"x15"x7½—16 gauge.

Drop Handles Both Ends.

Weight 16 lbs.

Olive Green Finish.

\$1.00 each

18,000
Used
One Piece
Steel
Tapered
Tote Pans

50¢ ea.



21x14x5½—16 gauge

PASSMAN BROTHERS

705 W. Washington Blvd.,

Chicago, Illinois

• UNUSUAL TOOLS •

SOLD WITH AN ABSOLUTE GUARANTEE OF SATISFACTION

Drills

- 3, 4 & 6 Spdl. Allen Hi-Speed, Power Feeds,
Tapping att., latest type.
4 spdl. Cincin. Bick., direct motor drive.
6-spdl. Allen, with power feed to each spdl.
5' Carleton, Radial, motor drive.
4 spdl. Leland G & Allen 12" overhang.
No. 1 P.&W. 2 spdl. horiz. deep hole, m.d.
6 spdl. P.&W. Deep Hole, vert., indiv. m.d.
Fox, Natco & Bausch Mult. Spdl. m.d.&m.(8).
No. 121, 217, 310 and 314 Baker (8).
21" & 24" Cin. Bick. (16), direct m.d.
3' American Hi Sp. Radial, motor on arm.
3 1/2' Morris Radial, single pulley drive.
Moline Hole Hog, various sizes (5).

Gear Equipment

- No. 16 Hi-sp. Gould & E. Gr. Hobber, spd.
No. 18H Gould & Eberhardt Hobber.
No. 36 S.T.G.&E. Auto., 4 spdl. Gr. R., m.d.

Grinders

- Blanch., No. 16 m.d., mtr., 36" mag. chk.
No. 126 Gardner, dble. spin. op. m.d. type,
Hyd. Feed.
No. 11, 12 & 14 B & S Cyl. (8).
53" Besley vert. disc. m.d. & M.
Nos. 6, 12A & 20 Bryant Int. Chuck (12).
12" and 16"x36" Cinc. Pl. Cyl. (2).
Heald Internal Nos. 60, 70, 72, 75 (8).
No. 11 Gid. & L. Tero., hyd., inter., m.d.&m.(4).
No. 12 Gid. & L. Ter. hydr., int. md.&m.(7).

SPECIALS

- No. 12 P. & H. Boring Mill, floor type, 7" dia. quill, m.d. 5 3/4" dia. spdl. nose.
Model "ID" Cleveland Single End Punch, m.d. cap. 2 holes, 1" through 1 1/8"
steel, 36" throat, Flanged ram. Latest type.

Lathes

- American, 20"x10", Geared Head.
Fay Automatics 14" standard (7).
Gisholt Simplimatics (2) m.d.
16"x6" Hendey Geared Head, t.a.
18"x8" Hendey, TA, DR & Collets, BMD.
24"x12" American Grd. Hd. 28"x8" 6".
31"x10" Wickes c/s., ecc'ric hds., all m.d.&m.
24"x10" Lodge & S. Crankshaft, m.d.&m.
34"x11" Wickes Crankshaft, m.d.&m.(2).
Nos. 5A, 6A, 6C P. & J. Auto. m.d.&m. (12).
P. & J. Auto. Unimatic, m.d. &m. (2).

Mills

- Gid. & L. Bor. No. 56, 6" dia. bar, app. 2
yrs. old, m.d. with hyd. duplic. attach.
Cinc., Vert. No. 4, rapid trav., late type.
Bor., 48" Bul. Vert. 2 turn. hds., dual control.
No. 2 Van Norman, BMD.
Pratt & Whitney Thread, 8x18".
Nos. 1, 2 & 3 Craftsman Rotary Production.
18" Cinc. Semi-Auto single & duplex heads.
Hall Planetary Thread, Style D. m.d.&m.

Presses

- Bliss Consolidated, O.B.I., No. 3, Grd. m.d.
Bliss Consol., O.B.I., No. 4, grd. M.D. (2).
Bliss Consolidated, O.B.I., No. 5, grd.m.d.

- Cleveland, O.B.I., No. 6-I, grd. m.d., (4).
Tel. No. 94 1/2-G, S.S., D.C., bk. grd. B.M. D&Mtr.
Cleveland, No. HG, O.B.I., gd. motor dr., (3).
Canco, No. 5, 8" st., S.S., BK. grd. m.d.&mtr.
Cleveland, No. 9 1/2-P, solid back, geared m.d.
Toledo, No. 62, s.s., b.k. grd., m.d. & mtr.
Toledo No. 24, cam drawing, mtr. drive & mtr.
Bliss, No. 3A, swinging ad. tbl., m.d. & mtr.
Knuckle Joint, 150 Ton Ferracure, GMD.
100 ton Oilgear Hydraulic, Vertical.
10, 25, and 50 ton Henry & Wright with
double roll feeds, belt and m.d.
No. 5A Toledo, O.B.I. flywheel type.
No. 14 Toledo Horning, geared motor dr.
No. 4A Bliss Adj. Bed Horning.
No. 204A Bliss Adj. Bed Horning, bk. gr., m.d.
No. 44 Cleveland, Adj. Bed Horning.
P-2, P-3, P-4 Ferracure, solid back, g.m.d. (12).
DG-53 Ferracure S.S., S.C., B.G., G.M.D.

Planers

- 24"x24"x6" Gray Double Housing, b.m.d.
36"x36"x14" Lib. Dble. Hsg., 3 hds. m.d.
42"x42"x12" Liberty Openside, m.d. & m.
60"x60"x12" Niles Bement Pond, box table.

Pipe Threaders

- No. 3 Williams m.d. & m., 6" cap.
No. 316-A Oster, 6" cap.

Welders

- Thompson Horiz. Butt, 35 K.W.
20-27 KVA Taylor-Winfield Spot (9).

- 10 KW Federal Spot (3).
100 KW Thompson Projection Spot.
200 KW Federal Projection Spot.

Miscellaneous

- Polisher, U.S. Electrical Tool, motor dr. in
base, 4-bearing, h.d. type (16).
Roller, Lev, 54", mtr. d., ap. 14 ga. cap.sheets
G & E Shaper, 20", high clutch type S.P.D.
Tapper, Holmes, No. 3 Tilted, 4-spdl., late type.
Auto. Cleveland 2" Model A, (4).
1 1/4" Cone Auto., 4 spdl., m.d.
Bender, No. 3U Pedrick, M.d.&m., latest type.
2 sp. 3/4" cap. Land Boltcut, ld. scr. att.
2 sp. 2" cap. Landis Bolt Cut., ld. screw att.
18" Gisholt Static Ball., vert. type m.d.&m.
2 sp. Coulter Dia. Borer, motor in base.
No. 23 Williams & White Bulldozer m.d.
Elwell-P Lift Trucks, 3 t. & 6 t. Hi-Lift (2).
Wicaco Oil Groover, vert. type.
Nos. 2 and 3 P. & W. Profilers, m.d. (3).
Berwick Rivet Heaters, (4).
Yoder Rolls 5 & 6 spin., 2-2 1/2" dia. shaft.
No. 6 H.S. Langeller Swager.
National Bent Shank Tappers, 1/2" Cap.
20" Sellers Slotter, b.m.d. Reeves Trans.

AND A COMPLETE STOCK OF FINE UP-TO-DATE EQUIPMENT

HARVEY GOLDMAN AND CO.

10571 GRATIOT AVE. DETROIT, MICH.

EMCO REBUILT

BORING MILLS

- 42" King, 1 swivel and 1 turret head on rail, 1 side head, m.d., very late type
- 2-42" King, 2 swivel heads on rail, m.d.
- 42" King, 1 swivel, 1 turret head
- 36" Bullard Spiral Drive, 1 rail, 1 side hd., very late, coolant system, thr. att.
- 24" Bullard New Era, m.d., 1 rail, 1 s.hd.
- 30" Bullard, cone
- 42" Gisholt, belt, 1 head
- 42" Gisholt, gear box, 2 heads
- 48" Niles Car Wheel Borer, belt

NEW 73" Niles Boring Mill, m.d. thru gear box, 2 swivel heads on rail, power rapid traverse.

- N.-B.-P. Cyl. Borer, d.c. m. d., has 7" and 12" main bars, 13 port hole boring bars
- No. 0 Fostick Horizontal, 3 1/4" bar
- No. 2 Beam. & S. Horiz., 3" bar, fl. type, m.d.
- No. 4 N.-B.-P. Horiz., 5 1/2" bar, table type

MILLING MACHINES

- No. 2A B.&S. Univ. s.p.d. taper spindle
- No. 2A B.&S. Univ. s.p.d., screw spindle
- No. 1, 2 Cleveland Plain, s.p.d.
- No. 3 Cincinnati Plain, s.p.d.
- No. 4 Kempamith Plain Maxi Miller, s.p.d.
- No. 2H Brown & Sharpe Plain, cone
- No. 1 1/2, 4, 3 Cincinnati Plain, cone
- No. 2 Van Norman Duplex, belt
- No. 3 Hendey-Norton Plain, cone
- No. 3 Kempamith Plain, cone
- No. 13B B.&S. Pl., s.p.d., taper spindle
- No. 25 Becker Plain, cone
- No. 22 Garvin Vertical, belt
- 6x48", 6x80" Pratt & Whitney Thread
- 24" Cinc. Pl. Auto., m.d., Nat. Standard
- 24" Cincinnati Duplex Automatic, m.d.
- 48" Cincinnati Plain Auto., m.d., worm drive
- 48" Cincinnati Duplex Auto., m.d., worm drive
- 24" Cincinnati Duplex Automatic, belt
- 48" Oesterlein Tilted Offset, m.d., Timken Bearings, National S. Spindle
- No. 3 Sundstrand Rigidmill, m.d.
- No. 21 Brown & Sharpe Automatic, m.d.
- C66A Newton 3 spindle Continuous, s.p.d.

GEAR MACHINERY

- 6" Gleas. Str. Bevel, belt, full set segments
- Gleason Gear Bisher, m.d., cap. 15" grs.
- No. 3 Barber-Colman, belt
- No. 3-26" Brown & Sharpe, belt
- No. 3-36" Brown & Sharpe, belt
- No. 3 Heavy Brown & Sharpe, s.p.d.
- No. 3-26" Cincinnati, belt
- No. 3A Lees-Bradner, belt, 14" size
- No. 1 Lees-Bradner Hobber, m.d.
- No. 6-60" Brown & Sharpe, m.d.
- No. 6-72" Brown & Sharpe, m.d.

GEAR MACHINERY—Continued

- No. 12 Barber-Colman, double overarm
- No. 12 Barber-Colman, single overarm
- No. 16HS Gould & E. Type B Hobber, s.p.d.
- 16" Cincinnati Gear Hobber, m.d.
- No. 18HM 2 spindle, G. & E. Hobber, m.d.
- No. 44 Brown & Sharpe Gear Hobber, m.d.
- Schuch. & S. Gear Tooth Rounder, belt

SHAPERS

- 10" Alba, gear box, new
- 15" Potter & Johnston Universal, gear box
- 18" Springfield, gear box
- 20" Cincinnati, cone
- 20" Queen City, cone
- 20" Smith & Mills, cone
- 20" Steptoe, cone
- 24" Barker, cone
- 24" Gould & Eberhardt, gear box
- 24" Potter & Johnston Universal, gear box
- 24" Rockford, cone
- 32" Cincinnati, cone

PRESSES

- No. 496D Toledo Toggle Drawing, weight 124,000 lbs.
- No. 268 1/4B Tol. Dbl. Cr. Toggle Draw., wt. 175,000 lbs.
- No. 34 Bliss Consolidated
- No. 93A Tol. Str. Side Dbl. Cr., geared
- No. 32B Toledo Double Crank Geared
- No. 54A Toledo Special, m.d.
- DG53 Ferracute Redrawing, geared
- S51 Ferracute Double Crank
- No. 50-4-36 Minster, S.S. D.C.
- No. 35 Toledo Geared Stiles Type
- No. 33 Swaine O.B.I.
- No. 25A Bliss, m.d.
- No. 16 Bliss Horning
- No. 6 Waterbury-Farrel D.C.
- No. 5 Matthews O.B.I.
- No. 5 Bliss Stiles Type
- No. 2 Verdin, Kappes & Verdin O.B.I.
- P2 Ferracute Stiles Type
- D2, DD2 Ferracute Drawing

ENGINE LATHES—GEARED HEAD

- 12"x6" Hendey, taper
- 14"x6" American
- 14"x8" American
- 14"x6" Hendey, taper
- 14"x6" Lodge & Shipley
- 14"x6" Prentice
- 14"x7" Lodge & Shipley
- 14"x7" Prentice
- 14"x8" Hendey, taper
- 18"x8" American
- 18"x10" American
- 18"x8" Prentice
- 18"x8" Sidney, m.d. in leg
- 18"x10" Boye & Emmes
- 18"x10" Prentice
- 18"x12" American

THE EASTERN MACHINERY CO.

MACHINE TOOLS

ENGINE LATHES—GEARED HEAD—Cont'd.

18"x14' American
18"x18' American
19"x10' LeBlond
20"x9' Lehmann, 16 speed, taper
20"x8' American
20"x14' American
24"x10' American
24"x10' LeBlond, relieving attach.
24"x10' Prentice

ENGINE LATHES—CONE HEAD

9"x3 1/2' South Bend
10"x5' Pratt & Whitney Tool Room
14"x6' Bradford
14"x6' Lodge & Shipley
14"x7' Lodge & Shipley
16"x8' American
16"x8' Cincinnati
16"x6' Cisco
16"x8' Hendey Yoke Head
16"x8' LeBlond
16"x7' Pratt & Whitney
16"x8' Lodge & Shipley
16"x8' Monarch
16"x32"x8' Putnam Gap
16"x8' Reed
16"x8' Rockford
16"x10' Schumacher-Boye
16"x10' American
16"x12' American
16"x14' American

MFG. LATHES

N.-B.-P. Quarter. Mch., m.d., brand new
No. 5 N.-B.-P. Center Driv. Car Wheel Lathe,
size 42x96", brand new
No. 5 N.-B.-P. Car Wheel Lathe, used, m.d.
No. 6, 9 LeBlond MultiCut, m.d.
Niles-Bement-Pond Axle Lathe, cone
No. 4AC LeBl. H.D. Auto. C.S. Lathe, m.d.
No. 12 LeBl. H.D. Auto. C.S. Lathe, m.d.
3 1/2"x36" LoSwing, belt
8" Sundstrand Stub, m.d.
14"x5' American Geared Head Mfg.
14"x8' LeBlond Rapid Production
15"x6' Automatic Threading
16"x6' American Turret, cone
18"x8' Chard Production, cone
20"x8' American Turret, cone
22"x5' Monarch Grd. Head Mfg., m.d. in base

PIPE AND BOLT THREADING MACHINES

4" Oster, belt
2" Saunders, m.d.
4" Eaton, Cole & Burnham, belt
2" Merrill, m.d.
No. 2 Bignall & Keeler, m.d.
No. 4 Bignall & Keeler, belt
8" Bignall, belt
Type E Amer. Pipe Bend. Mch., m.d., new

PIPE & BOLT THREAD. MCHS.—Cont'd

American Bolt Header, belt
2" Landis Double Head Pipe & Nipple, belt
1 1/2" Landis 2 spindle Bolt, m.d.
1 1/2" Landis 2 spindle Bolt, m.d.
2 1/2" Landis Bolt, m.d., 2 heads
2 spindle 1" Acme Bolt, cone
3 spindle 1" Acme Bolt, belt
1 1/2" Acme Bolt, belt

HAMMERS

Pettingell Bumping, belt
60 lb. Bradley Rubber Cushioned Helve, belt
100 lb. Bates, m.d., new
100 lb. Beaudry, belt
200 lb. Bradley Upright Strap, belt
250 lb. Little Giant, belt
350 lb. N.-B.-P. Steam or Air, brand new
550 lb. Bement-Miles Steam
650 lb. American Steam

PLANERS

24" Cincinnati Crank, m.d.
24"x24"x6' Gray, 1 head, belt
24"x24"x6' Ohio, belt
24"x24"x6' Smith & Silk, m.d.
24"x24"x8' Cincinnati, belt, 2 heads
28"x28"x10' Cincinnati, belt, 1 head
30"x30"x8' Pond, belt, 1 head
30"x30"x10' American, belt, 1 head
30"x30"x10' Cincinnati, belt, 2 heads
30"x30"x12' Gray, m.d., 2 heads
30"x30"x12' Gray, m.d., 2 heads
32"x32"x8' Gray, belt, 1 head
36"x36"x10' Woodward & Powell, belt, 1 hd.
36"x36"x12' Fitchburg, m.d., 3 heads
36"x36"x12' Niles, m.d., 4 heads
39"x39"x10' Cincinnati Forge, belt, 2 heads
48"x48"x18' Putnam, belt 4 heads
55"x55"x30' Betts, 2 heads, reversing m.d.

BROACHING MACHINES

Oil Gear Type XB10, Twin Ten Hydraul., m.d.
No. 1, 2, 3, J. N. LaPointe, m.d.
No. 2, 3 LaPointe Double, belt
No. 2, 3 LaPointe, belt

RADIAL DRILLS

6' Amer. Triple Purp., m.d. on arm, 17" col.,
elec. col. clamp, p.r.l., late, enclos. hd.
6' Amer. Triple Purp. m.d. gear box on base,
18" column, inc. head
3' Amer. Sens. d.c., m. on arm, enclos. head
3' Carlton Sensitive, belted m.d.
3' Morris Plain, var. speed m.d.
3 1/2' Dreeses Plain, gear box
3 1/2' 4' Morris Plain, gear box
4' Hammond Jack Knife, m.d.
4' Hammond Jack Knife, wall type
5' 6', 7' Amer. Triple Geared, gear box
5' Dreeses Plain, gear box
5' Dreeses Plain, gear box, 15" col.
7' Fosdick Plain, cone
No. 1 Barnes Horizontal

1001 Tennessee Ave., Cincinnati, Ohio

SELECT Inland TOOLS

No. 4 Kempamith Maximiller Plain Milling Machine, Power Rapid Traverse, S. P. D.

Grinder, No. 2 B. & S. automatic surface. Air compressor, 7"x6" Worth, dup., m. d., com. Grinder, surf. 12x36 Diam. auto., hyd. fd., m. d. Lathe, 20"x8" American; 24"x12" South Bend. Lathe, eng., 16x6 Amer., grd. hd., m. d. collets. Lathe, 14x8 Hendey, collets, pan bed, ser. 25400 Lathe, 20x12 Cisco grd. hd., m. d. tap. att. Lathe, eng., 30"x18" Hou-Stanw-Gamble hvy. d.

Mill & shap. Mach. No. 14 Coch-Bly duplex. Milling machine, No. 2 1/2 Rockford plan. Planers, 24"x24"x6" Ohio, 30"x30"x6" Columbia. Presses, Nos. 2, 3, 4 & 5 Bliss Consol. o.b.i. pl. Presses, Nos. 5, 6, & 7 o. b. i., Bliss Cons., b. g. Shaper, Hendey 20"xV" ram, m. d. Shapers, 16" Queen City, 16" Smith & Mills; 16" Kelly; 17" Averbek, all b. g. Shear, 10", 14 ga. 6", 14 ga. D&K pwr. md prac new Rigidmil, No. 3 Sundstrand, motor dr., power rapid traverse.

Inland Machinery Company
41 So. Clinton St. Chicago, Ill.

— USED MACHINERY FOR QUICK SALE —

LATHES

No. 2 X-W. & S. Hol. Hex. Turret Lathe 2 1/2" dia. cap. Auto. Chuck & Pwr. Roller Fd., Cross Slide & Counter-4. No. 7 Bardons & Oliver Geared Head Turret Lathe, Air Chuck & Cylinder, Arr. for M. D. 42"x14" New Haven Lathe.

GRINDERS

No. 1 Wilmarth & Morman Tool & Cutter Grinder. No. 12 Brown & Sharpe External Grinders. No. 2 Brown & Sharpe Rotary Ring Grinder. 10"x72" Type A Norton External Grinder, M. D.

PLANERS, SHAPERS

36"x36"x10" Cleveland Openside Planer, M. D.

JAMES W. GEORGE 3146 E. Jefferson Avenue, Detroit, Michigan

MILLS

4" Pratt & Whitney Spline Mill with countershaft.

DRILLS—RADIAL

No. 2 Henry & Wright Drill Press, Two Spindle, M. D. 21" Cincinnati Drill, Press, High Speed, M. D. 25" Foadick Upright Drill, Sliding Head, M. D. No. 23 Foote-Burt Drill Press, 20" Swing, Table 20x16".

MISCELLANEOUS

No. 5A High Speed Ruvet Hammer. 20 H.P., 1170 R.P.M., 220/440 V., 3 Phase, 60 Cycle, Type 5K404, G. E. Mtr. with Starter and Line Switch NEW. Precifer Flame Cut. Mach., cap. up to 12" thick x 25 1/2" x 59". Complete with regulat. gauges, hose, etc. NEW.

200-Ton Niles-Bement-Pond Hydraulic Wheel Press.
400-Ton Niles-Bement-Pond Hydraulic Wheel Press, All Steel Arr. For Motor.
42" Gisholt Vertical Boring Mill, 1-Pl. and 1-Turret Hd., With A. C. Motor.
30" Colburn Vertical Boring Mill, Turret Head on Rail, (old style).
3", 4" and 6" Radial Drills.
5" Niles-Bement-Pond Full Universal Radial, with A. C. Motor.
No. 2 Cincinnati Universal Cylindrical Grinder.
No. 2 Cincinnati Plain Cylindrical Grinder.
71"x48"x14" Cincinnati Planer, 2-Heads.
13"x16" Peerless Shop Saw, with A. C. Motor.
8"x10 Ga. D. & K. Pan and Box Type Brake.
16" (18")x8" Whitcomb-Blaisdell Geared Head Lathe, (Nearly New).
3-A Motor Driven High Speed Hammer.
6"x6" Peerless Shaping Saw, Arranged For Motor.

ABOUT 300 OTHER MACHINE TOOLS, COMPRESSORS, ETC. IN STOCK
THE NORTON-BROADWAY MACHINERY CO., 610 Baymiller Street, CINCINNATI, OHIO

AUTOMATICS:

B. & S. No. 0 & No. 00.
B. & S. No. 00 Turret former.
Clev Mod A, 7/8"; Mod B, 1 1/2".
3/8" R. 4 Acme Grid. 4 sp., No. 20,000; 3/8" R6. sp. No. 22,000.
Grid. Mod G, 3/8" Mod F, 1 1/4".

DRILLS:

Aurora 20" Sliding Hd. H. D.
1—3 Spindle 1/2 inch.
1—4 Spindle 1/2 inch.
Washburn 3/4" 2 a. p.

GEAR CUTTER

B. & S. No. 3 Automatic.
B. & S. Gear Tester.

B. & S. Gear Tooth Rounder.

GRINDERS:

Besly Disc Grinder.
Landis No. 2 Universal.
B. & S. Univ. Tool & Cut.
10"x36" Norton cyl. c. a d. (3).
Norton Pl. 6"x32". (2).
W & M dbl. end drill grinder.
Heald Internal No. 55.

LATHES:

Hendey Yoke hd., 14"x6" Ser.
No. 20,000, tap. att., C. D.
Rockford 14"x6" Eng. Q.C.G.,
3 Step C. D.
LeBlond h. d., 18"x12", c. d.

MILLERS:

Cinc. No. 2 Universal, all att.
Garvin No. 2A Univ., all att.

PIPE THREADERS

Rogaco Portable 2" (2).
Oster 4" B. D.; Apex 6" B. D.

PLANERS:

Powell 30"x30"x8", 2 H. D.

SHAPERS:

Potter & Johnson 15" Sw. Tble.
Sim. 16" tilting table, vise.
Stockbridge 20" crank, vise.

TURRET LATHES:

J & L 2 1/4"x24"
W & S 1 1/4" & P & W 3/8" (2).

We Specialize In Rebuilding Automatic Screw Machines, Manufacturers of the Rogaco portable pipe threading machine.
Triplex Machine Company, 117 Fourth St., Pittsfield, Mass.

BUY WITH CONFIDENCE

BORING MACHINES

- No. 1 Cleveland, 2½" bar.
 No. 1 Blomquist-Eck, 3¼" bar, s.p.d.
 No. 1 Lucas, 3" bar, motor drive.
 No. 2 Coffman, 3¾" bar, motor drive.
 No. 2 Barrett, 5" bar, extension bed.
 5" Bar Niles-Bement-Pond, Fl. Type.

BORING MILLS

- 24" Bullard, "New Era."
 30" 36" King.
 42" Gisholt, motor drive.
 42" King, motor drive.
 48" 54" 60" Colburn.
 52" King, motor drive.
 60" Gisholt, motor drive.
 72" King, motor drive.
 72" Niles, Bement, Pond.
 10' Niles.

DRILLS

- No. 2 Colburn, 3, 4 Spindle.
 No. 12 Colburn, 1 Spindle.
 No. 314 Baker Heavy Duty.
 No. D-4 Colburn Heavy Duty.
 No. 1, No. 3, No. 4 Bausch Multiple.
 3' American triple purpose, late type.
 3' Western Plain Radial.
 4' Carlton plain.
 4' American triple purpose.
 4, 5' American triple purpose.
 6' Western Plain Radial.
 7, 8' Western Heavy Radial.

GRINDERS

- 8"x18", 36" Cinn., Plain, Saddle Type.
 20"x168" Landis Pl., Motor Drive.
 26"x96" Landis.
 No. 2, 2½ Universal (Bath type).
 No. 4 Landis Universal.
 No. 70 Heald Internal.
 No. 22-12" Heald rotary surface.
 No. 16-26" Blanchard vert. surface.
 No. 16-A Blanchard Auto. Vert. Surface.

LATHES

- 14"x6" Lodge & Shipley Sel. Grd. Hd.
 16"x6", 8' Shipley.
 16" x 7' Lehmann grd. hd., taper. att.
 16"x10" Am. grd. hd., relieving att.
 16"x8" L&S. Grd. Hd., taper att.
 20"x10" Lodge & Shipley Grd. Hd.
 19"—38"x10" Le Blond Sliding Bed Gap.
 22"x12" L&S. Grd. Hd. taper att.
 24"x12", 14", 16" L&S., grd. hd.
 24"x14", 16" American, Geared Head.
 27"x12" American Geared Head.
 30"x11" 15" American, Geared Head.
 30"x12" Lodge & Shipley, taper att.
 36"x20" Le Blond hvy. geared head.
 36"x24" Bradford, taper att.
 46"x30" Houston, Stanwood & Gamble, m d

NORTON MOTOR DRIVEN GRINDERS

- | | | |
|-----------------|-----------------|-----------------|
| 6"x32" | 10"x72" | 14"x96" |
| 10"x18" | 10"-15" gapx72" | 16"x50" |
| 10"x24" | 10"x96" | 16"x72" |
| 10"-15" gapx24" | 14"x36" | 18"x96" |
| 10"x36" | 14"x50" | 18"-24" gapx96" |
| 10"x50" | 14"x72" | 21"x96" |
| 23"x120" | 20"x144" | |

MILLERS

- No. 1-B, No. 2-B, No. 3-B Milw. pl.
 No. 2, No. 3, No. 4 Cincinnati Plain.
 No. 4-B Brown & Sharpe, plain.
 No. 1-B Milwaukee Universal.
 No. 2 Brown & Sharpe Universal.
 No. 3 Cincinnati Universal.
 No. 2 Cincinnati vertical, m.d.
 No. 3-B Milwaukee Vertical.
 No. 5-B, No. 6, No. C-2 Becker Vertical.
 6"x14", 6"x48" Pratt & Whitney Thread.
 No. 4, No. 12 Lees-Bradner thread.
 No. 5—48" Cincinnati Hydromatic.
 18" & 24" Cincinnati Auto. Duplex.
 24"x24"x12" Ingersoll, adjustable rail.
 36"x36"x12" Newton Duplex.

PLANERS

- 24"x24"x12' Gray.
 30"x30"x14' Gray, reversing motor dr.
 36"x36"x10' Gorton.
 36"x36"x8", 18" Cincinnati.
 36"x36"x14"—24" Cleveland Open Side.
 42"x42"x30" Niles-Bement-Pond, Rev. M.D.
 44"x36"x12' Gray.
 48"x48"x16" Niles-Bement-Pond.
 72"x48"x10" Cincinnati.
 72"x60"x16" American Widened Pattern.

PRESSES

- No. 01, No. 1 V&O., O.B.I., M.D.
 No. 1½ V&O., O.B.I., M.D.
 No. 20 Bliss, O.B.I., M.D.
 No. CG—24 Ferracute O.B.I., Geared, M.D.
 No. 3; No. 5 V&O., O.B.I., grd., M.D.

SHAPERS

- 20" Smith & Mills.
 24" Gould & Eberhardt.
 32" American, Extra Heavy, Late Type.

TURRET LATHES

- No. 5 Foster Univ., Timken Bearing.
 No. 1-B Foster Universal.
 No. 1-A Warner & Swasey, Motor Drive.
 No. 2-A W. & S., A. C. & B. F.
 No. 2-B Foster Univ., Timken Bearing.
 No. 3A Warner & Swasey, 4¾" H.S.
 No. 3-B Foster Universal.
 No. 4-L Gisholt, cross sliding turret.

HILL-CLARKE MACHINERY CO.
 645 W. WASHINGTON BOULEVARD, CHICAGO

VERTICAL BORING MILLS

16' Betts; 2 swivel heads; M. D.
60" Gisholt; 2 swivel hds.; Power
Rapid Traverse, M. D.
54" Bullard New Era Type Vert.
Turret Lathes; Motor Drive.
53" N.-B.-P.; 2 swivel hds.; Power
Rapid Traverse; Motor Drive.
44" N.-B.-P.; 2 swivel hds., Pwr.
Rapid Traverse, Motor Drive.
48" Colburn; 2 swivel hds., S.P.D.
42" Bullard; 2 swivel heads; Pwr.
Rapid Traverse; S. P. D.

HORIZONTAL BORING MILL

4 1/2" bar Nila-Bement-Pond Duplex
Control Table Type; M. D.

MILLING MACHINES

No. 2-B Milwaukee Univ.; M. D.
No. 2 Cincinnati Univ.; Belt Dr.
No. 33 B. & S. Auto.; Mtr. in Base.

LATHES

30"x17' Hout., Stan. & G.; B. D.
26"—48"x28' McC. Dbl. Sp. B. D.

14"x6' American Grd. Hd.; M. D.
14"x6' Hendey Grd. Hd., Taper,
Motor Drive.

GRINDERS

No. 16 Blanchard Direct Mtr. Dr.
Vert. Surf.; 26" mag. chuck.
No. 33 Abrasive Surf.; Mtr. in Base.
No. 3 Abrasive Surf.; Mtr. in Base.
10"x72" Norton Plain.
No. 24 Gard. Hor. Disc; 53" dia.
No. 14 Gardner Disc; 20" dia.
No. 8 Badger Ball-Bearing Disc.

TURRET LATHES

No. 3A Warner & S. Univ.; M. D.
3"x36" Jones & L.; S. P. D.
AUTOMATIC SCREW MCHS.
9/16" Acme 5-Spdl. Model "C";
Slot, Attach.; Motor Drive.
1 1/4" Cone 4-Spindle; Motor Dr.
1 1/4"-1 1/2" Cleveland Model "A".

**RADIAL DRILLS AND
DRILL PRESSES**

7' Cincinnati Bickford; M. D.
7' American Full Univ.; M. D.

4' & 5' Cincinnati Bickford; M. D.
3' & 4' American; M. D.
24" Cincinnati Bickford; S. P. D.
No. 2 Avey 4-Spindle; M. D.

MISCELLANEOUS

GEAR HOBBER, No. 12 Barber
Colman.

HAMMER, 300-lb. Bradley Helve.

PLATE PLANNER, 18' Hilles &
Jones; 3/4" cap.

KEYSEATER, No. 2 Baker; M. D.

PRESS, No. C-4; Incluable Ferracute

HYDRAULIC RIVETER, 150-ton
Chambersburg; 6" stroke.

ROLLS, Wickes; vertical type; cap.
12"x1 1/2"; largest roll 23" dia.;
2 smaller rolls 17" dia.

SHAPER, 24" G. & E.; M. D.

SLOTTER, 24" Newton; 42" rotary
table; M. D.

SHEAR, Hilles & Jones Throatless.

SUN MACHINERY COMPANY, INC.

36 VAN VECHTEN STREET, NEWARK, N. J.

3000 MACHINES IN OUR WAREHOUSES

BORING MILLS

Bullard 24" New Era, M.D.
Niles 42" Two Head.
B., 36", 42" 2 hds. on rail.
Bullard 76" vertical.
Giddings & Lewis No. 32 hor.
Rockford No. 2, 2" bar.
Barrett No. 2 cyl., 5" bar.

DRILLS

P. & W. No. 1 Gun Barrel.
P. & W. Nos. 11, 12, 13 Mult.
Cin-Bick 31" Radial.
Foodick 4" Radial, M.D.
N.-B.-P. 6" Radial, Univ.; Reed-
Prentice 6" Radial.
Upright Drills—All mak. & siz.
Allen 3, 4, & 6 sp. B.B.
Detroit No. 2, 5 Spdl. Hor.

GRINDERS

Blanchard No. 16.
B. & S. Nos. 1, 2, 3. Univ.
Bryant Nos. 6, 10A, 18A, S.A.
2 Sp. Hole, No. 40 Chuck.
Disc Grind.—All makes & siz.
Heald No. 70, 85 Internal.
Heald No. 72A3 Gagematic In-
ternal, M. D.
Norton 10"x18" M.D. Plunge
Cut.
Heim Centerless.
Rivett No. 6, 103 Internal.
Nort., 6x32", 10x36", 10x50",
10x72", 14x36" Pl. Cyl.

LATHES

Hendey Lathes—most sizes.
Monarch 16"x10' G. H. Ball
Bearing.
American 20"x8", g.h.
New Haven 24"x10", 24"x12",
24"x20".
Pittsburgh 32"x24", g.g.g.
American 36"x17", G.H.
W.&S. Nos. 1A, 2A, 3A Tur.
W-F No. 3 Chucking.

MILLERS

Kempsmith No. 3 Universal.
Becker No. 6 AB V.
Cin. No. 2 Vertical, S.P.D.
Van Norman No's. 1, 2, 3, Dupl.
Lincoln Millers of all kinds.
P. & W. 6x14", 6x48", 6x50"

Thread millers.
Milw. & Garvin Cam Millers.

PRESSES

Bliss No. 18, 19 & 20 O.B.I.
V. & O. No. 12, 14 D.A.C. Im.
Zeh & Hab. 8 1/2" Percus.
Bliss No. 21, 100 ton K. J.
W-F 200 ton Knuckle Joint
Wat.-F. No. 6 D.A. Pillar Cam.
Ferracute No. 105 D.A.
Ferr. D.G. 53 S.S. Draw.
Terkelsen D-1 150 t. M. Spring.
Stand. No. 4-R S.S. Reducing.
W-F Long. Stroke for shells.
W-F No. 3 Blanking.
Ferracute No. PG-P4.

Henry & Wright 25 & 50 ton
Dieing Machines.

Bliss No. 16, 4" str., Overh.

SCREW MACHINES

Grid. 9/16", 3/8", 1/2" Mod. G.
Clev. 3/8", 1/2", 5/8", 3/4", 2",
2 1/4", 2 1/2", 4 1/4" Auto.
B.&S. Auto.—most sizes (we
are specialists).
New Brit. 1 1/2", 1 3/4", 1 7/8" A.
Cone 1 1/4" Automatic.
Hand Screw M. of all makes &
sizes; W. & S., Foster, B.&S.
Jones & L. St. Hd. T. L.,
2 1/4"x24", 3x36".
Potter & Johnston Nos. 5A, 6A
Chuckers.

MISCELLANEOUS

Broches, LaPointe 1-2-3-4.
Burnishing Barrels, Abbott.
Hammers—Board Drop, must be
moved.

Henders, many sizes & makes.

Lapper-Norton 15C.

Measuring Machines, P.&W.

12", 24" & 48".

Rolling Mill, Robertson 12"x12"

for non-ferrous metal.

Shapers—from 7" to 32".

Slitter, Braddock 36" M.D.

Tapper—Threadnut No. 2

auto. nut.

Wire Formers, Nilson & Baird.

BOTWINIK BROTHERS, INC.

37-127 WATER ST.

:-:-

NEW HAVEN, CONN.

MILES' QUALITY TOOLS

BORING MILLS

- 3" Binsee knee type.
- 3 1/2" No. 3 Universal.
- 3 1/2" No. 5 Defiance.
- 4" D. & H. floor type.
- 24" Bullard with side head.
- 34" Colburn single turret.
- 36" Niles car wheel.
- 42" King.
- 42" Detrick & Harvey.
- 51" Bullard.
- 60" Gisholt.
- 84" King. Practically new.

DRILLS

- 21" 24" & 28" Cincinnati.
- 24" Barnes all geared.
- 21" 24" 28" Superior.
- 24" Aurora.
- 30" Snyder.
- No. 121, 217, 314, 315, 321 Baker.
- No. 2 Mfg. Colburn 1, 2, 3, 4 spdl.
- Nateo multiple, Nos. 11, 12, C12, 13, C13, 14, B14 & 30.
- No. 1 Baush multiple.
- No. 1 Pratt & Whitney gun.
- 6 spdl. Pratt & Whitney deep hole.
- Nos. 6D, 11D & 16D Moline.
- No. 10D Moline cylinder borer.
- 5 spdl. Detroit automatic.
- Nos. 15 1/2 & 17 Foote Burt.
- 2 1/2" Morris radial.
- 3" Drees radial.
- 3" Cint. Bick. radial.
- 3 1/2" 4" 5" and 6" Western radial
- 4" Mueller radial.
- 4" Hammond radial.
- 5" American triple purpose radial.
- 6" N.B.P. univ. radial.
- Sensitive; All makes and sizes.

FORGING TOOLS

- Nos. 3, 25, 8 & 9 Williams & White buildgers.
- Nos. 3B & 51 Nazel hammers.
- No. 1A Ajax forge rolls.
- 1" 1 1/2" 2" & 4" Ajax up-setters.
- 1 1/2" Acme upsetter.
- 1" No. 3 W. F. cold header.
- No. 60 W. F. thread roller.

GEAR CUTTERS

- Nos. 7, 7A, 75, 75A, 77A and 6 Fellows shapers.
- No. 12 Barber Colman.
- Nos. 12H8, 18H & 36H Gould & Eberhardt hobbers.
- No. 1 Mfg. & 5A Lees Bradner.
- 2 1/2" G. & E. spur. & bevel.
- 36"x10" Newark automatic.
- 48", No. 4 B.&S. automatic.
- Gleason quenching press.
- Fellows hourglass generator.

- Nos. 2 & 2 1/2 Bilton auto.
- Gleason bevel tester.
- Ingle tooth rounder.
- G & E cutter grinder.
- Fellows cutter & gear checker.
- National Cleveland cutter & gear checker.
- No. 10 B Lees Bradner gear grinder.

THREE 10" PRATT & WHITNEY HYDRAULIC GEAR GRINDERS

GRINDERS

- No. 2 Cincinnati centerless.
- Head Internal, Nos. 70, 72A3 Sizenatic & Gagematic.
- No. 6 Bryant internal.
- 26", 30" & 36" Blanchard Surf.
- 8" & 12" Arter rotary surf.
- 6"x36" Norton surface
- 8"x43" Bath surface.
- 8"x38" Manhattan surface.
- 14" Pratt & Whitney BB surface.
- 14"x48" No. 5 Abrasive surf.
- 16"x48" Diamond surface.
- 20"x50" Safety Emery surf.
- 30"x54" Diamond face.
- 18" 24" & 30" Gardner disc.
- Nos. 8 & 221 Badger disc.
- 24" No. 84 Gardner opp. disc.
- Norton:—10"x18" to 14"x72".
- Landis:—10"x24" to 16"x72".
- Modern:—12"x24"
- Cin.:—12"x36" & 12"x48" univ.
- No. 4 Brown & Sharpe univ.
- No. 2 1/2 Bath universal.
- 8" Arter auto piston ring.
- No. 184 Greenfield cutter.
- Woods tool and cutter.
- National Tool worm.
- Pratt & Whitney worm.
- No. 524 Mummert Dixon Swing.
- Gisholt tool grinder.
- 24" Ingersoll tub.
- No. 20 Bath spline.

ENGINE LATHES

- 10"x5" Pratt & Whitney.
- 12"x6" Monarch.
- 13"x6" Willard.
- 14"x6" Monarch.
- 16"x6" Monarch.
- 16"x8" Lodge & Shipley Grd.hd.
- 16"x10" Leblond.
- 18"x10" Morris geared head.
- 20"x8" Monarch.
- 20"x10" Reed Prentice grd. hd.
- 20"x12" Morris grd. hd.
- 21"x18" Leblond.
- 22"x10" Davis.
- 22"x10" Rahn Larmon.
- 22"x10" Hendley.
- 24"x12" Lodge & Shipley.
- 24"x14" American grd. hd.
- 24"x16" Boye & Emmes.
- 25"x14" Leblond grd. hd.
- 26"x11" Wickes.
- 26"x12" Hendley.

LATHES, TURRET

- Nos. 1A, 2A, 3A, 2 & 6 W.&S.
- Nos. 2, 2A, 3A & 6 W. & S.
- Nos. 2 B. & 8. universal.
- 18" Libby.
- 21" Gisholt.
- 14" 31" Cincinnati Acme.
- 24" Bullard vertical.

MILLERS

- Nos. 3 & 4 Cincinnati.
- No. 2 Ivy. & 3B B. & Sharpe.
- No. 4 Hendey.
- No. 4 LeBlond.
- No. 2 1/2 Rockford.
- No. 3 Kemp Smith.
- No. 4 LeBlond.
- No. 2 B. & 8. universal.
- No. 3 Cincinnati universal.
- No. 35 Ohio universal.
- No. 3—24 Cincinnati Hydro-matic.
- 24" & 48" Cincinnati duplex.
- 18" 24" & 48" Cincinnati auto.
- 48" Ohio tilted offset.
- 4 1/2"x12" Pratt & Whitney thread.
- Nos. 13B & 33 B.&S. Mfg.
- Nos. 1 & 2 Kent Owens hand.
- No. 3PV Kent Owens power feed.
- 66"x36"x8" Ingersoll adj. rail.
- 30" & 42" Ingersoll rotary.
- 48" & 54" Newton rotary.
- Davis & Thompson drum
- Model C Becker vertical.
- No. 3 Sundstrand Rigdimil.
- 28" 37" & 42" Brigs.
- Taylor & Fenn spline.

PLANERS

- 24"x24"x2" Cincinnati crank.
- 24"x24"x6" Gray.
- 32"x32"x12" Niles.
- 36"x36"x10" Cincinnati.
- 36"x36"x16" Cleveland open-side.
- 42"x36"x10" Liberty open-side.
- 48"x36"x10" Liberty open-side.
- 48"x48"x12" Woodward & Powell.
- 56"x56"x16" Gray.

SHAPERS

- 7" Rhodes.
- 10" McMahon.
- 15" Potter & Johnston.
- 16" Ohio.
- 16" Kelly.
- 16" Walcott.
- 16" Steptoe.
- 16" Gould & Eberhardt.
- 20" Hendey.
- 24" Gould & Eberhardt.
- 24" Potter & Johnston.
- 24" Walcott.
- 24" Cincinnati shaper planer.
- 25" Cincinnati.

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12x6 Hendey grd. hd., taper, m. d.
 14x6 LeBlond, double back grd., b. d.
 14x6 Hendey, taper, belt drive.
 14x6 Hendey, draw-in, motor drive.
 14x8 Hendey, taper, draw-in, d. b.
 14x8 Am. Timken Spdl., motor in base.
 14x10 American, taper, belt drive.
 16x6 Hendey, taper, belt drive.
 16x8 Prentice, taper, motor drive.
 16x8 American, taper, belt drive.
 16x8 Hendey, taper reliev. attach., b. d.
 16x8 Hendey, g. h., tap., draw-in, m. d.
 18x12 L. & S. patent hd., taper attach.
 18x8 LeBlond double back grd., b. d.
 20x8 Prentice Bros., geared head.
 20x10 L. & S. patent hd., with tap. att.
 24x10 S. & B. q. c. taper attach., b. d.

24x12 S. & B. q. c., belt drive.
 27x10 American grd. hd., motor drive.
 27x10 Amer. grd. hd., taper att., m. d.
 27x12 American grd. hd., m. d.
 27x16 Amer. grd. hd., taper att., m. d.
 32x12 L. & S. q. c., belt drive.
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 30x18 Amer. grd. hd., taper, m. d.
 30x20 American grd. hd., m. d.
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GEAR CUTTERS—G & E 60" & B & S 26" s. p. d. automatic spur; Fellows 24" gear shaper. Cincinnati 36" gear cutter.

GRINDERS—P & W 12" vert. surf.; Cin. No. 1½" B & S No. 12 Univ. tool, B & S Nos. 11 & 16 plain, Heald Nos. 60 & 65 Int.; B & S No. 13 Univ. & Tool; Landis 10x30" Plain; B & S 10x48"; 3—Norton 6x32" plain, Heald No. 20 Rotary Surface (3). B & S No. 2 Univ.; Badger No. 220, auto. d. e., opposed disc (4); Walker 8" Rot. Surf.; Modern No. 6 Int. Brown & Sharpe No. 2 Surface.

KEYSEATERS—Mitts & Merrill No. 5 vert. Davis No. 1 and No. 2, & Catlin No. 2.

LATHES—Monarch 16"x10" M.D.; LeBlond 18x8"; Lehmann 18"x9"; Amer. 22x8"; Davis 22"x10"; L & S 20"x10"; S-B & E 20"x10" q. c. g. Flather 22"x10"; Bradford 21"x10"; LeBlond 16"x8"; P & W 17"x10"; Gleason 45"x12"; Johnson 36" x24"; Monarch 16"x8" (2). Hendey 14"x6" & 16"x8".

MILLING MACHINES—Ohio No. 29 Univ.; Kemp. No. 3; Brown & Sharpe No. 3; Cleveland No. 1 single pulley dr., univ.;

Amer. No. 1½; Cin. No. 3; B & S No. 3; Hendey No. 3; LeBlond No. 3; Mil. No. 3-B & Cinc. No. 3 s. p. d. pl.; Becker Model "B" & No. 6 vert.; Kemp. No. 33 spd. Prod.; Ingersoll slab, M.D. 33", table 30½"x16"; LeBlond No. 4 m. d. pl. Cin., No. 1½ Univ. M.D.; Cin. No. 4 pl. High Power; Cin. 12" Mfg. & 24" Auto. Clevel. No. 2 S.P.D., Pl. B.&S. No. 0 Pl.

PLANERS—Gray 30"x30"x10' 2 heads; Gray 48"x48"x10'; Gray 28"x28"x6' 1-hd.; Pond 32"x34"x10'; Hamilton 60"x36"x10', 2 heads.

PUNCH PRESSES—Toledo No. 3, o.b.i.; Federal Nos. 1, 2, 3 o.b.i.; Bliss No. 62 geared; Ferracute No. P-4; Toledo No. 52 arch; Fer. No. EGF 52 Coning; Willard No. 4A o.b.i.; Swaine No. 38 arch, geared; Swaine No. 37 o.b.i.; Bliss No. 83 Reducing; Niagara No. 4½ Rock, Nos. 2 & 3; & Verson No. 4 o.b.i.

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SHAPERS—S & M, G & E, Ohio, Mi., Q. City, Davis, Cin. 16"; Ohio & G & E 20"; S & M, Q. City, Rock. 24"; Ohio 26"; Cin. 24" s. p. gr. box; Rhodes 3½" Vertical; American 24" heavy, b.g. Amer. 15"; Springf. 15"; S.&M. 26", b.g.

SCREW MACHINES—W & S No. 4 & No. 6 Hand; Nat. Acme. Nos. 515, 52, 55, & 56 4-sp.; Gridley 4-sp. ¾"; Automatic, B.&S. No. 00 auto.

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- 14"x6" & 16"x6" Bradford.
- 14"x6" American, Grd. Hd., M. D.
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- No. 665 Toledo 800 ton coining.
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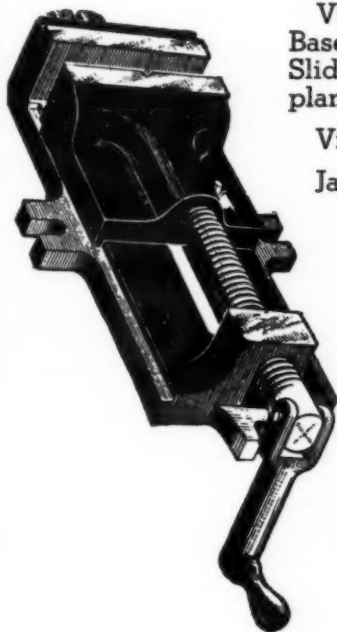
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No. 12 Minster H. D.; 24" Barnes All Geared Self Oiling belt drive.

GRINDERS, 14"x72" Norton Plain; 12"x72" Landis M. D.; No. 78 W. & M. Surf. M; D.

LATHES, 38"x14" Fifield—Cheap; 16"x8" Sidney, double back geared, quick change; 14x6 Carroll Jamison; 18"x8" Lodge & Shipley, Geared Head.

MILLERS, No. 2B Brown & Sharpe plain, single pulley drive; No. 6 Becker Vertical with ball bearing countershaft; No. 3H LeBlond heavy duty plain.

PLANERS, 30"x30x8" Cincinnati, two heads on rail; 36"x15" Betts, 2 heads.

PRESSES, O. B. I.—No. 3 and 4 Walsh; No. 3 American Can.

RADIAL DRILL, 3' Prentice, gear box drive; 3' Cincinnati Bickford cone drive.

SCREW MACHINES, No. 4 Warner & Swasey plain screw machine,

3—No. 1 Brown & Sharpe wire feed; No. 4 Milholland; No. 4 Foster cone head.

1½"x9"; Acme cone head; No. 5 Foster grd. head—No. 4 Warner & Swasey grd. hd.

SHAPER, 28" Kelly B. G. Single pulley drive, 10 H. P. A. C. Motor.

Many other tools—exceptional "buys"—write for full details.

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"READY TO SHIP"

NORTON Open Side Surface Grinder, 6"x10"x36", Motor Driven.

NORTON 3"x18" Plain Cylindrical Grinder, 10"x50" countershaft.

CINCINNATI No. 2 Universal and Plain Millers, countershaft.

WARNER & SWASEY No. 1-A Turret Lathes, chucking equipment, Single Pulley Drive, Serials 250,000.

WARNER & SWASEY No. 4, No. 2 and No. 1 Turret Lathes, Wire Feed, Cone Drive.

FITCHBURG Low Swing Lathes, geared head, S. P. D., 5"x5' centers.

LODGE & SHIPLEY 24"x16' Screw Cutting Lathe, 12 speed geared Head, Single Pulley or motor drive. Serial 26,000.

PRATT & WHITNEY No. 13 Multiple Spindle Drill Press, rectangular head.

NATCO No. 14 Multiple Spindle Drill, 22 spindles, R. A. Head, 18"x26" Table 22"x30", S. P. Drive. Serial 11,200.

ALLEN High Speed Sensitive Drills 2, 3, and 4 Spindle.

BROWN & SHARPE No. 2 Hand Screw Machines, Power Feed to Turret, c./s. drive.

GOULD & EBERHARDT Crank Shapers, Cone Drive 24"-16"-14".

CLEVELAND 2 1/4" Automatic Model A.

GRIDLEY 1 1/4" 4 Spindle Automatic Model F, countershaft drive.

BROWN & SHARPE No. 0 Automatic Screw Machine, countershaft drive.

LOY & NAWRATH 10 ft. Power Squaring Shear, 3/16 capacity, m. d.

DREIS & KRUMP 6 ft. Box and Pan Brake, Motor Drive, 10 gage.

NIAGARA 7-B Geared Inclined Power Press, 5" stroke.

Other just as desirable tools in our large stock. Send for catalog.

MORRIS MACHINERY COMPANY, INC.

97 Chestnut Street

Newark, N. J.

UNUSUAL TOOLS

No. 2 Acme Full Universal Turret Lathe Motor Drive, Chuck, Late Type.

Single Spindle Coulter Diamond Boring Machine, Motor Drive, Like New.

No. 16 Blanchard Grinder, 26" Chuck, 25 H. P. Motor on Spindle, 1900 Serial.

(2) Gisholt Simplimatic Lathes with Three Large Power Feed Tool Blocks, In excellent condition. Serials 18,000.

2" Buffalo Armor Plate Bar Shear, Motor Drive and Motor.

No. 2 Van Norman Duplex Mill, complete, Index Head, Motor Drive and Motor, A-1 Condition.

(2) No. 78 Wilmarth & Morman Surface Grinders, Motor Drive.

(3) No. 3 Wilmarth & Morman Surface Grinders.

Imp Lo Swing Automatic Lathe, Front, Rear & Top Slides, Air Chuck, Two Motors, 1937 Machine.

(2) 4"x36" Lo-Swing Lathes, Motor Drive & Motor, Hardened Ways, One has back Facing Attachment, Serials No. H-5200, H-5142.

No. 4 Kempnith Maxi-Mil., Rapid Traverse, A-1 Condition.

No. 3 Cincinnati High Power Mill, A-1 Condition, Motor Drive.

(2) Model U Lo Swing Semi-Automatic Lathes, Motor Drive.

(4) No. 3 Baush Multiple Spindle Drills, Up to 36 Spindles.

No. 75 Heald Internal Grinder, Motor Drive, Two Motors.

18" - 24"x8' - 12' Springfield Geared Head Lathes, Timken Spindle, Taper Attachment, Motor in Base, Late Type.

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OTT MACHINERY SPECIALS

AUTOMATICS: Cleveland, Model M, 3" Bar.
Cleveland, Model A, 1 1/2", 2" and 4".
Cleveland, Model C-14" Motor Drive.
5-spindle Davenport, 9/16".
DRILLS: Radial-3" and 5" Bickford, S. P. D.
3" and 5" Western, Motor Drive.
GRINDERS: B. & S. No. 11 & 14 Plain, S. C.
Blanchard Rotary, S. 28" Map. Chuck.
P. & W. 14" Model B Vertical Surface, M. D.
Heald Nos. 55, 60, 65, 70, and 75.
10x30" Webster-Perks Universal.
Norton Plain, 6"x32", 10"x24, 36", 50" & 72".
Norton Crankshaft, 18"x62".
Landis Crankshaft, 16x18" S. C.
Landis 10"x36" Hyd. Type B, 30" wheel.

LATHES: American 16"x6", GH, QC, TA, MD.
Springfield Ideal 18"x8" T. A., M. D.
MILLS: No. 1-B Milwaukee Plain.
No. 2 Van Norman Duplex, M. D.
No. 3 Brown & Sharpe Plain, Cincinnati.
No. 34 Heavy Ohio Universal.
No. 94 P Cleveland-Verson, O. B. I.
No. 45 D. S., 66" Cleveland Double Crank.
Hall Planetary Thread Mill, M. D.
Presses: No. 56 Toledo Trimming, Side Shear.
No. 29 Bliss Arch, bed 21x23 1/2".
SHAPERS: 24" G. & E. Motor & Reeves Drive.
16" Queen City and 24" Cincinnati, Cone.
Shears, Squaring, Ohl 10"x16", M. D.

OTT MACHINERY SALES, Inc., 548 Second Ave., DETROIT, MICHIGAN

HIGH GRADE MACHINE TOOLS

No. 3B BROWN & PLAIN MILL—S. P. D.
No. 2B BROWN & S. PLAIN MILL—S. P. D.
No. 2B BROWN & S. VERTICAL MILL, S. P. D.
No. 3 SUNDSTRAND RIGID MILL.
No. 22 HEALD ROTARY GRINDER—M. D.
No. 6A POTTER & JOHNS. TUR. LATHE—M. D.
No. 1B FOSTER GEARED HEAD TURRET
LATHE BAR EQUIPMENT.
No. 4 WARNER & SWASEY TURRET LATHES

PLAIN AND UNIVERSAL.
No. 11 BROWN & SHARPE GRINDER—S. P. D.
No. 5, 5A, 6 TOLEDO PUNCH PRESSES.
No. 12 BARBER COLMAN GEAR HOBBER,
Dbl. Overarm.
24" CINC. UPRIGHT DRILL—LATE TYPE.
6-SPDLE. EDLUND HIGH SPEED DRILL.
75-150 HP SPRAGUE DYNAMOMETER.
HUNDREDS OF OTHER MACHINE TOOLS IN STOCK

Indianapolis Machinery & Supply Co., Inc.
1959-69 SOUTH MERIDIAN STREET INDIANAPOLIS, INDIANA

LATHES

54"x18" Johnson, m. d., triple geared.
36"x16" Putnam, b. d., triple grd., q. c.
28"-35"x12" Boye & E. (raised), b.d., ch.
28"x12" Boye & Emmes, belt drive, chk.
20"x8" Amer., 12" spd. grd., hd., reg. eq.
19"x8" LeBlond, belt drive, reg. equip.
18"x14" Cinc., b. d., tap. att., chuck.
17"x6" LeBlond, b. d., reg. equip.

MISCELLANEOUS

52" King, vert. 2 hds., rap. trav., q. ch.
No. 4 Pratt & Whitney Vertical Die
Sink. & Milling Mch., table 18"x72".
2" & 4" Landis Pipe Machines
14"x36" Pratt & Whitney Surf. Grinder.
18" Gould & E. Gr. Hob., cap. 30"x12".
"G" Rock River Punch 24" throat cap.
3/4"x3/4", motor drive

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NEW 3 Phase B. B. Motors 1/2 to 25 H. P., 5 H. P. \$55.75

DRILLS

20" Lever, Wheel & Lever and Power Feed.
24" and 28" sliding head, back gear, power feed.
Bausch Multiple 16 spindle No. 1 Morse Taper.
4 spindle Foote-Burt, heavy duty.
6 spindle Hole Hog No. 1 Morse Taper, power fld.
1, 2 and 4 spindle high speed 8" overhang.
5" Bausch Radial Drill.
59 other drills of various sizes and types.

MISCELLANEOUS

Brake, Robinson, toggle.
Brakes, 6" and 10" for 18 gauge.
Grinders, cutter and cylindrical, plain and univ.

This is only a partial list of our large stock, which is constantly changing. Write for what you need.

THE OSBORNE & SEXTON MCHY. CO., Dept. H. COLUMBUS, OHIO

Grinders, Bryant deep hole chucking.

Broaching machine, No. 1 LPointe.
24"x 12" South Bend Lathe, with raising blocks.
31 other lathes 10" to 24" swing, 5' to 14' beds.
Milling Machines, Nos. 1 1/2, 3 and 4 plain.
Milling Machine, 20"x20"x8" Ingersoll Slab, m. d.
Milling Machine, No. 1 Bilton, automatic gear.
National Acme Automatics Nos. 52, 53 and 55.
Shapers, 16", 18", 20" and 24" b. g. crank.
Turret Lathes, 21" and 24" Gisholt, m. d.
Planer, 36"x36"x14" Gray Standard Pattern.
Press, No. 24 Toledo double acting cam drawing.
MOTORS, REBUILT 3 Phase 1/2 to 50 HP various speeds.

IF WHAT YOU WANT ISN'T HERE *Send Us Your Inquiry*

BRAKES:

No. 183 Chicago 8 ft. 12-ga.
No. 614 Chicago 6 ft. 14-ga.
No. 618 Chicago 6 ft. 18-ga.

DRILLS:

Radial, 3 ft. Fordick.
Natick Type K 20-spd.
Rail. Foote-Burt Nos. 2 & 4, 4 spdl.
Allen BB 5-spindle.
Allen BB Type B sgl. spdl.
Demco DAH BB. MD.
36" Cincinnati BG PF SL.
25" Bickford, G. E., American
BG PF SL.
20" & 24" Prentice BG.

GRINDERS:

Disc, No. 6—20 Besly.
Disc, No. 220 Badger & press.
Disc, No. 41; Besly 20".
Drill, New Yankee, D. E.
Internal, Madison, Nos. 60 & 65
Heald.
Surface, No. 210 Heald 8".

HAMMERS:

50-lb. Little Giant MD.
40-lb. Bradley Helve.

LATHES:

26"x12" Putnam Pacific type, DBG,
Semi-QCC, T. A. 26" Chuck.
18"x8 1/2" Rahn & Mayer.
18"x8" Lodge & Shipley MD.
14"x6" Lodge & Shipley.

LATHES—Turret:

16" Type A Gisholt, 6 1/4" hole.
21" Type H, Gisholt, 3 3/8" hole.
24" Type I Gisholt, 4 1/2" hole.
24" Type I Gisholt, 4 1/2" hole.

MILLERS:

No. 1-B Kearney & Trecker Plain.
No. 2 LeBlond, plain, M. D.
Nos. 2 & 3 Kemp Smith, plain.
No. 25 Becker-Brainard.
No. 3B Owen, DH, Vert. att.
No. 12 Brainard, universal.

PRESSES:

Hydraulic, 42-ton Elmes.
OBI, No. 0, 4 1/2" Loughbough-Jordan.
Str. Side, No. 7 Z & H, geared.
Str. Side D-44 Pexto OBI No. 29
Swaine.

PUNCHES & SHEARS:

Queen City DE, 1/2 in 1 1/8", M. D.
Rock River L, 1/2 in 1 1/8", 24 thr.
Cleveland C. SE, 3/4 in 3/4", 26 thr.
No. L-10 Badger, DE, 1/2 in 1 1/8".
No. 14 1/2 W-W.
No. 54 Beloit S. E.

SHEARS:

Jig, GEM, 18 ga. cap., M.D.
Rotary Bevel, Lennox 3/4".
Square, Stark 9"; 18 ga. cap.

THREADERS, Pipe & Bolt:

Murchee, 3/4" dbl. head, bolt.
Pipe, 2" Oster M. D.

MISCELLANEOUS:

Bender, No. 15 Wallace.
Dbl. Seamers, Swain.
Compressor, H-B CCB, 14x9x8,
20 HP motor.
Groover, 30" Toledo.
Planer, 30"x30"x8" Pease and
Wheeler.
Metal Band Saw, 14" Racine.
Saw, cold, No. 2-B Cochr.-Bly.
Shaper, 20" Smith & Mills.

Brown Mch. Co., 2333 N. Ninth St., St. Louis, Mo.

SELECTED BARGAIN ITEMS

PRECISION LATHES, Hjorth 8"x36" and STARK, complete.
Cincinnati No. 2M Plain Miller, all geared.
Cincinnati 18" Mfg. Millers.
Becker No. 25 Miller—Ohio No. 3 Full Universal Miller.
Bridgeford Lathe 26"x10"—American Lathe 24"x12".
Warner & Swasey No. 6 Turret Lathe.
GRIDLEY 2 1/2" Model "G" 4-spindle automatic screw machine.
National Acme 3" Model B 4-spindle automatic screw machine.
Gridley 9/16" Model "G" 4-spindle automatic.
Knight combination vertical milling and drilling machine.
Niles 42" Vertical Boring Mill, 2 heads.
Toledo No. 4 O. B. I. press, motor drive.
American 3" Radial drill — — — Diamond No. 6X Disc Grinder.
American Lathe 20"x10" — — — Sidney 12"x6" geared head Lathe.
LUCAS No. 21 Horizontal Boring & Drilling machine.

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CHICAGO, ILLINOIS

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24"x14' Lodge & Shipley.
24"x10' Bradford.
20"x8' Lodge & Shipley.
18"x12' Hendey.
16"x10' Sebastian.
16"x8' Cincinnati.
14"x6' Monarch.
13"x5' Willard.

DRILLS, RADIAL

4' Western; 4' Mueller.

MILLING MACHINES

No. 1 Brown & Sharpe Univ.
No. 1½ Hendey Universal.
No. 1B Brown & S., Plain.
No. 2 Brown & Sharpe Plain.
No. 3 LeBlond Plain.

PIPE MACHINES

5' Oster.
12' Curtis & Curtis.

SHAPERS

16' Steptoe.
20' Steptoe.
24' Gould & Eberhardt.

McBRIDE & McCLENNEN

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Philadelphia, Pa.

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No. 16 Blanchard, Direct Motor Drive.
No. 4 LeBlond Plain Miller, S. P. D.
No. 2 Cincinnati plain miller, cone.
16' Steptoe Shaper, Cone.
4½' Morris Radial, Gear Box, S. P. D.
3½' American Radial, Gear Box, Swinging
and Swivel Table, S. P. D.
No. 1 Hoosier Hvy. Duty Drill, 2" cap. M. D.

24"x12' South Bend 36" Gap Lathe, Cone.
24"x10' Swings 27½" Greaves-Klusman
Hvy. Duty Lathe. 20" 4-Jaw Chk., Cone.
21"x12' LeBlond, Hvy. Duty Lathe, Cone.
16"x48" Landis Crankshaft Grinders, Self-
Contained Countershafts. Motor Drive.
3 Spindle Leland-Gifford Drill, with Grd.
Tapping Hds. No. 2 M. T.

IROQUOIS MACHINERY CO., 660 Ohio St., Buffalo, N. Y.

LOOKING FOR TOOLS?

Consult The

BUYERS GUIDE!

AUTOMATIC SCREW MACHINES

Cleveland	Mod.	Ser. No.	Driv.
35—% 2 to 5 1/2"	A	28-34,000	Plain
Brown & Sharp			
No. 2, full auto. rebuilt		2875	Plain
No. 19, full auto.		156	2 H.P.
No. 00, full auto.		5349	Plain
No. 00, cut off,		5514	Plain
Gridley			
1—1 3/4" 4 spdl.	F	6624	10 H.P.
1—2 1/4" 4 spdl.	F	2500	10 H.P.
1—2 1/2" 4 spdl.	F	8568	Plain
1—9/16" 4 spdl.	G	10000	5 H.P.
6—% 4 spdl.	G	10000	5 H.P.
2—1 1/4" 4 spdl.	G	10000	5 H.P.
1—4 1/4" 1 spdl.	G	2500	2-5 H.P.
Cone			
6—% 4 spdl.		600 up	5 H.P.
6—1 1/4" 4 spdl.		600 up	5 H.P.

HAND SCREW MACHINES

Acme, plain head, % "x4" Belt Drive.
B. & S. No. 1 plain head, % "x3", belt drive.
Foster No. 3 tric. B. G. P. F. turret.

DRILLS

Leland Gifford, h. s., b. b., sensitive, % " ca.
Demco h.s., b.b., % " capacity.
1, 2, 4, spd. Allen, pwr. fd.; 4 spd. Washburn.
2 sp. Leland-G. h.s., b.b., sens., % " cap.
3 spindle. Avey, H.S., B.B., bench type % ".
Drills, 28", 30", 32", sliding head, belt drive.
Drill, Baker No. 310, h.d., No. 5 M.T., m.d.

GRINDERS

Gear cutter, No. 23 Brown & S., 8" cap.
No. 10 Besley disc. 18" dia., discs., b.d.
Grinder, Landis, 10x20 plain.

SCOTT MACHINERY SALES, INC. 1811 Carroll Av., Chicago, Illinois

Over 30 YEARS' EXPERIENCE IN REBUILDING MACHINERY

VERTICAL BORING MILLS

36" Bullard New Era, M. D.
42" King.
42" Gisholt.

HORIZONTAL BORING MILLS

No. 21 Lucas, 3" bar.
3 1/2" Rockford.
3 1/2" D. & H. floor type, arr. m. d.

MULTIPLE SPINDLE DRILLS

No. C8 Natco, arr. 24 spindles.
No. 11 Natco, arr. 6 spindles.
No. 12 Natco, arr. 20 spindles.
No. 14 Natco, arr. 22 spindles.

RADIAL DRILLS

Two—3" American, s. p. d.
3 1/2" American, s. p. d.

GRINDERS

Eight—6"x32" Landis plain.
10"x16" Norton type A plain.
10"x24" Landis plain.
16"x32" Landis plain.
14"x36"—42" Norton model 81

type B crank pin.

No. 1 Brown & Sharpe Univ.
No. 3 Abrasive surface, arr. m. d.
No. 2 Diamond type B surf., m. d.
6"x10"x48" Norton hyd. surf., m. d.

No. 16 Blanchard surface, m. d.
No. 16A Blanch. auto. surf., m. d.
No. 13 B. & S. univ. & tool grind.
Heim centerless, m. d.

HEADERS

Several No. 0 Wat. F. d.s.s.d., m. d.
No. 1 Wat. F. d. s. s. d., m. d.
No. 3 Manville, d. s. s. d.
No. 3 1/2 Water, F. d. s. s. d.

LATHES

12"x6" Hendey yoke head.
14"x5" American geared head.
14"x6" American geared head.
15"x6" Hendey geared head.
16"x6" Monarch helical geared.
16"x6" Hendey geared head.
16"x10" Prentiss, geared head.
30"x11" American.
27"—30"x16" L. & S. sel. grd. hd.
28"—48"x16" McCabe dbble. spdle.
26"—48"x24" McCabe dbble. spdle.

MILLERS

28" Cinc. semi-auto., plain.
28" Cinc. semi-auto., face.
28" Cinc., semi-auto., duplex.
36" Cinc. auto. manufacturing.
16"x14" Pratt & W. g. h., thread.

Webster & Perl, 10 x 36 m.d., self cont., c/s.

KEYSEATERS

Mitts & M.; No. 2 Davis; fully equipped, B.D.

LATHES

Gisholt 21 Universal Turret Lathe.
Hamilton 16 x 8 q.c., d.b.g., 2 chucks.
Monarch, 18x8 q.c., d.b.g.

MILLERS

Hand Millers: Kent-Owens, U. S., Chicago
No. 2 Knight vert., univ. Slotter.
No. 1Y Brown & Sharpe, power feed.
Boring Mill, Horiz. Rochester, 3" bore. M.D.

PRESSES

25 ton Henry-Wright, dieing, with feeds, b.d.
No. 15 Robinson, horn type with table and motor, a.c. 220 volts.
No. 74 Consolidated, gap type combination geared, 3" stroke, 56 ton capacity.
Waterbury F. s.s., grd. 8" str., 30 ton.
DG56, Ferracite, tog., 4 1/2" and 9" str., 100 t.
Hercules 15 t. pwr. forg. or broach., m.d.
Press Brake, Geo. A. Ohl, 10"x3/16" M.D.
No. 59 Toledo St. Side gear press M. D. 35 h.p.

MISCELLANEOUS

20" Amer., back grd., crank, vise, c/s.
Little Giant, 100 lb., belt drive.
Threading machine, 2" Landis belt drive.
Planer, 24x24x6 Ohio heavy duty, 1 head.
Saw, No. 2 Klem, band, for metal cutting, b.d.
Separator, American, Cap. 1 1/2 bushels, belt d.
Separator, McKinzie, for chips, blwr. type.
Tapper, Garvin No. 2, cap. 1 1/2" and 3 1/4", b.d.
Napier Band Saw, 10"x10", Model B.
12"x36" D & W Magnetic Chuck.

J. L. LUCAS & SON, INC.
3 FOX ST. — BRIDGEPORT, CONNECTICUT



A STOCK OF OVER 2000

99% NEW TOOLS

No. 5 B. & S. Surface Grind-
er, Hydraulic Feed, Perm.
Mag. Chuck.
Lathe, Hardinge, Precision,
1" cap.

ANGLE IRON SHEARS

Wilmington, 6x6x3/4", double end
No. 2 H. & J. 6x6x1 on turntable
Angle & Beam Shear, 8x8x1

AUTOMATIC SCREW MACHINES

No. 000 B. & S., Ser. No. 8300
No. 00 R. & S., Ser. No. 9800
Auto. No. 52, 1 1/2" Gridley 4 spdl.
3" Cleveland Model A, sq. pan.
Nos. 1, 2 and 3 Manville Auto

BORING MILLS

2" Niles Cyl. Boring Mach. D. S.
8" Niles Vert., 2 heads, M.D.
Niles-Bement-Pond, S.P.D.
2" Gisholt vertical
No. 2 Rochester 3" Bar
2" Bullard, 2 heads on rail
& H. Horz. Boring Bar, 7"
quill, 4 1/2" bar

BRAKES: Hand

Chicago Steel 10 1/4 ga., 3 1/16 ga.,
4 1/2 ga., 4 1/4 ga., 6 1/16 ga.,
8 1/8 ga., 8 1/16 ga., 8 1/4 ga.,
10 1/16; 10 1/8.

BRAKES: Box & Pan

5", 6" and 8" 1/4 ga. Ch. St.
10 ga., 4 1/4 ga. Chgo. steel—Fr.

BRAKES: POWER

1", 10 3/4", 12 1/2" Chgo. Steel,
Power Clamping, 8 1/4 ga., 8 1/2
ga., 6 1/16 ga., 6 1/2 ga., 3 3/4 1/16"

CAN MACHINERY

No. 201 V & O auto. Thread Roller
lagata, Hulbert Type, 26" throat
Double Seamers: No. 3 Bliss; No.
125 Adriance; Toris Wold for
oblong cans; Toris Wold semi-
auto, cap. 5" dia. 8" high cans;
No. 1 Hobler; No. 108 Camer-
on, semi-auto, cap. 10"x13",
M.D.; Bliss, for 5 gal. sq. cans.

DRILL PRESSES

7" Canedy-Otto, vertical, M.D.
Timken bearing (3).
eland Giffords, 1 to 4 spdl.
sp. Edlund, P. F. No. 2B Ed-
lund, 3 sp.
No. 2 Bausch Mul., 22 sp.
No. 11 Natio Multi, No. 14 Natco
11en High Speed, 1, 2 and 3 sp.
leveland 2 sp. hi-speed
spindle Detroit Horiz. Auto.
No. 3 Avey High Spd., B.B., M.D.

FOLDERS

00-30"-36"-42" Bar Folders

GANG SLITTERS

2" Am. Can (10); 36" L. & N.
6" Cameron; 48" Bliss

GRINDERS

16x66 Landis Cylindrical
No. 12 B.&S. Cylindrical
No. 1 1/2 Cinc. Tool & Cutter
No. 75 Haid Internal
No. 4 Gallmeier & L., M.D.
6"x20" Fitchburg Cyl.
8"x4" Dia. Face, M.D. No. 2 Cinci.
No. 16 Blanchard Sur. 36" Mag.
Ch.
No. 3 Diamond Sur. 12x48, M.D.

GROOVERS: Power

0' Stoll; 8' Niagara; 36" and 48"
Niagara; 48" Stoll

HAMMERS

100-lb. Mayer Trip; No. 7 Beaudry
200-lb.
200-lb. Bradley Cushion Helve.
No. 2B Nazei
Stand. Auto. drop, 200; 300; 400
lbs.

IRONWORKERS

Univ., 6x6 angles; No. 1 Buffalo

KEYSEATERS

Nos. 2 & 3 Mitts & M. with cuts.

LATHES

36"x20" New Haven; 30"x16" L.
& S. Q. T. A.
9"x31"; 16"x31" P. & W., Q. C. G.
18"x28" Hamilton; 18"x10" L. &
Shipley, G.H., m.d.
24"x12" Reed P., Gnt. Hd. T.A.
36"x30" L&S 24" cent., qcz; 48"
18" Schu. & H.
24/48 McCabe Dbl. Spindle
14"x6"; 16"x6"; 18"x8" Monarch;
14"x6" Bradford,
30" Pit Lathe, dia. face plate 156"
64"x25" Bement Engine
38"x20" Harrington, \$850.

LATHES: Spinning

Prtybil 22" B. B. (7); 24", 28"

LATHES: Turret

No. 6 Warner & S., G. H.
No. 4 & No. 6 W. & S., cone; No.
3 Foster
No. 9 Barlons & O., No. 8 Foster
Sundat, Stub Lathe, 8" cap, M.D.
Foster, 1 1/2" cap.; 21" Gisholt

PLANERS

48"x16" Cleveland open-side
26"x8" Cleve. Open-sd.; 24x8 Cl.
36x12 Open-side Dietrich & H.
20" Niles Plate Planer

MILLERS

No. 2B. Kearney & Tr., div. hd.
No. 21 R.&S. Plain; No. 3 & 4
Cincel. Vert., M.D.
48" Cine. Auto., No. 25 Ohio U.
No. 2A E. & Tr. V.H., No. 1A
No. 1V, B.&S., Horiz.
No. 2, 3, 4B, 5B Becker Vert.
Model C Becker Vert.
No. 2 Pratt & W. Die Sinker

MILLERS (Cont.)

No. 2 and No. 3 Cin. Cone; No. 3
R.&S. plain.
Thread Mill, 6x48, P. & W., m.d.
36"x168" Ingersoll, planer type
Ingersoll Planer Type, Mil. Mch.,
40 H.P. mtr., tble 48"x22"—4
Heads

NIBBLERS & UNISHEARS

No. 1, No. 1B, No. 2 Cambell
Nibblers, M.D.
No. A14, A-10, Unishear
No. 0 Gray Nibbler, 1/8" cap.

RADIAL DRILLS

2 1/2" Reed P.; 5" Carlton M.D.
6" Am., 5" Ford., 6" Western, 6" U.
3" Heavy type, Reed P.; 2 1/2" Am.
4" Hammond Jackknife Type, M.D.

RIVETERS: Stake & Punch

New Doty, 52" throat; Rock River,
56" throat
No. 2A, 3A, 5A & 5 1/2 B High
Speed Riveting Hammers

ROLLS: Bending

8 1/2" Beloit; 50"x4" Bertsch, b.d.
8 1/4 gauge Bertsch, motor drive
48"x3"; 36"x3"; 6" Beloit, 7 1/2"
roll, drop end
8"x1 1/2" Niles Pyr. drop end.

Rolls, Angle Bending, 4x4
1/2, M.D.

ROLLER DIE MACHINES

7-Spindle, Adjustable, M.D.

LEVELLERS: ROLLER

48" 17 rolls, M.D.; 38" Hilles&J.
50" Leveler, 8 rolls, 4 1/2" dia.
54" McKay 17 Rolls, M.D.

PUNCHES

No. G 15 Rock River; No. 8
Whiting, 24" th.
No. 000 H. & J. Dble. End Punch

SAWS

No. 0, 1 & 2 Ryerson Fric.;
Hack Saws; 13x16" Peerless; 6x
6", 9x9" Peerless Shaping.
30" Atkins Metal Band Saw
No. 8 Marvel

Hydraulic Scrap Baler 150
lb. bales, Galland & Hen-
ning, 66" x 16 1/2" x 24"
Chamber.

SHAPERS AND SLOTTERS

20" Queen City; 16", 24", 28"
and 32" G. & E.; 20" G. & E.,
m.d.; 20" Ohio; 16" Milwaukee
24" American SPD thru gear box;
24" Bement Slotter

SHEARS: Power and Foot

6x3/8" Chgo. Steel 24" gap
10' 18 ga. Niag.
6' 10 ga. Robinson
Bertsch 10' 3/16"; 10-14ga., m.d.
13 3/8" United
10' 3/16" Chgo. Steel, M.D.
10' 10ga. Robinson
10' 1/2" Nia. 18" Gap.
10' 3/8" Nia. 18" Gap.
10' 1/2" United Eng. 5' 1/2" Toledo

INTERSTATE MACHINERY CO.

SELECTED MACHINES

SHEARS: Power and Foot (Cont.)

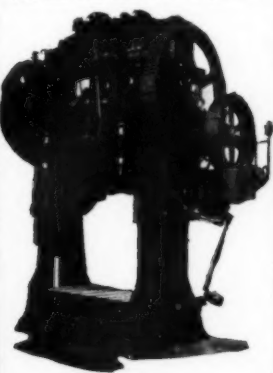
12' 14 ga. Streine; 12' 10 ga. Bertsch.
6' Thomas Gap Shear, 1" Cap.
24" Gap
52", 14 ga.; 72", 14 ga. Pexto
42", 18 ga. Niagara
No. 1 1/2 B & K Milw. Alligator
Shear, all steel
Rotary Quickwork, No. 10 60"
thr. 14 gap
Quickwork No. 25, cap. 7/32"
Footless 10 ga. 1" & 1/2"
Foot Shears, 20", 30", 36", 96"
Circle Shears, No. 19 Niagara, 12
ga.; No. 299 Pexto, 20 ga.; No.
535 Pexto, 16 ga., M.D.

WELDERS: Spot

5, 7 1/2, 10, 25 KW.
100 KW Federal Projection Weld.
Butt welders, 30 KW; 65 KW;
75 KW

WELDERS: Arc

400 amp. Wilson
300 amp. Hanson
400 and 600 amp. P.&H., gas m.d.



400B Bliss, Toggle

PRESSES: Double Crank

No. 96-G Toledo, 146" betw. upr.,
24" str., tie-rod, wt. 162,000 lbs.
No. 17 Bliss, Gap Fr.; 8" str.
50,000 lbs.
No. 7-F Bliss, 96" betw. upr.,
No. 103 Bliss Cons.; 92C Toledo,
10" str.; 30"x42" bolster.
Multiple Gang Punches: No. 6 Nla.
36" bet.; 941G-Toledo, dbi.
crk., Tie Rod Fr. 8" str., 16 1/2"
shut height, 36"x84" bed, m.
d. spring cns.; No. 35 W.&W.
8" bet. hou.; No. 30A W.&W.
gang 54" bet. hou.
Ferracute sgl. or dbl. act. toggle
20" str., 27 1/2" die space, 43"
x73" bed, m.d.
No. 138A Stoll, 38" bet. uprights
No. 1D Bliss, dbl. cr., 4" str., 40"
between uprights. Back geared

PRESSES: Horn

No. 25 1/2 Bliss, B.G., swing table
No. 14 Toledo; No. 116A Nla.
No. 21 Bliss; No. 42 Toledo; No.
24 Adriance
No. 41A Toledo; No. 12 Nla.;
No. 39 Bliss
No. 43P Toledo, 18" throat
No. 14 Toledo B.G.; No. 24 Bliss
Consolidated B.G., 6" stroke

EXCEPTIONAL TOOLS GRINDERS

No. 16 Blanchard Surf.
Grinder, 36" chuck
No. 5 Brown & Sharpe Sur-
face Grinder, Hydraulic
feed, permanent magnetic
chuck, M.D.
No. 25 Landis Cylindrical
Grinder, 24" x 144", self-
contained

LATHES: Turret

No. 31 Gisholt, hardened
ways, m.d.

LATHES

16"x8" Pratt & Whitney
Geared Head, fully equip-
ped, tool-room machine
18"x10" Lodge & Shipley
Geared Head M.D. Tool-
room lathe
64" x 25" Bement, 36" x 30"
Lodge & Shipley, Quick
Change Gear
48"x10" Schumacher & Boye
30" Fit Lathe, 156" face plate
Sundstrand 8" stub lathe

JIG BORER

No. 2 Pratt & Whitney, M.D.

MILLERS

No. 2B Kearney & T. Univ.
Div. Hd. & Vise
No. 4 Cinc. Vert. Rapid Tr.

PRESS BRAKE

10"x3/16" Chicago Steel

RADIAL DRILLS

5' Carlton Motor Driven
6' American; 8' Western

SHAPERS

32", 28", 24" Gould & Eb.
Inv. Gear Box Drive

PLANNER

20' Niles Plate Planner

ROLLER LEVELLERS

McKay, 17 rolls, 54" wide

PRESSES Deep Throat

Toledo No. 17, 20" thr.; No. 15

PRESSES: Straight Side

No. 601 S. Toledo, 1500 t. tier-
No. 66 Cons. 8" stroke
No. 57 Toledo, 8" str.; No. 50
Toledo air cushioned bed
No. 6 Walsh, b. z., 3 1/2" str., 10
die space
No. 74W Bliss Wedge type
All Steel 250 ton, 12" str., Ma-
quette air cushion, bed 54 x 3
m.d.

PRESSES: Toggle

No. 3 1/2-B Bliss; 3 1/2 & 3 1/4
No. 408-B Bliss, 84" bet. upr.
50 x 84 bed
No. 409 Bliss, 108" bet. upr.

PRESSES: Coining

No. 664 Toledo, 600 ton, N
27K Bliss 1000 ton—2 1/2"
600 ton Waterbury Farrel

PRESSES: Hydraulic

NBP Gap Frame
Woods, 150 ton, 49" bet. hsh
No. 272T Elms, 325 ton, 40
bet. uprights

200 ton Watson-S., 2-10"
rams platen 36"x10", 38"x
62" bet. columns
350 ton Southwark, 30 dia.
ram, 42"x54" bet. columns
1000 ton Birdsboro, triple
ram platens 10"x12"

PRESSES: Stiles or Solid Bar

Ferracute, P2, P3, P4, P.G.5
No. 4 Bliss, No. 83 Bliss
No. 4N, 5N Bliss; 34P Tol. (10)

PRESS BRAKES

Verson All Steel, 60"x14 ga. ca
10' 14 ga., 10', 3/16", 101" O
Press Brake, 10' 3/16 D.&K.
Chgo. Steel, Motor Drive

PRESSES: OBI

No. 5 Toledo (5); No. 5 Cons.
No. 20 Bliss; No. 40 Perkin
No. 14 Stoll
No. 4 Nla.; No. 3 Toledo; No.
Bliss Horizontal, 8" str.
No. 3 Niagara (5); No. 2 Pack
No. 62 Bliss Reducing 8" Stro
No. 4 L & J; No. 75B Toledo
8" Nla.

MISCELLANEOUS

Air Comp.: 10x10 Ing. Ran
14x12 Ing. Rand
Buffer: No. 3-D Gardner, 5H
motor, BR.
Column facer, 48" Newton, M.
Filing Mch., No. 3 Thiel, M.D.
Furnace, Elec., large Pusher ty
Gear Hobber No. 18 G. & E.
Groovers: 48" Stoll, Pw.; 6' Sto
8' Nla.
Davis Gas Acetyl. Gen., 300-lb. f.
54" Columbia Paper Cutter, Pow
No. 8 Mott sand blasting ont
No. 4 Gaternamer Pne. Tapp
Oil Separator and Chip Crush
Pipe Threaders, 2" to 10"
Tumbling Barrels, 32"x44"
steel
Wire Straighteners: 3/8"x8"; N
6 Wells 3/8"x22"
No. 2X Garrin Tapper

Guaranteed

DRILLS

6' American Triple Purpose Maxi-Sp. 17" Col. Tap. Att. A. C. motor mounted on arm. Extra right angle base.
5' Drees Univ. rad., arr. m. d.
3½' Morris rad. A. C. Mtr. Dr.
4 spindle Avey, B. B. 2 M. T.
4 spindle L-G No. 2 M. T. p. f.
1, 2 & 3 Sp. Allen, P. F. & T. A.
1 & 2 Sp. Demco, H.S.B.B. T.A.
20" Barnes all-grd. self-oiling.
28" Cin-Bick Tap. Att., Gr. Box.
No. C-5 Natco, 10 spindles.
No. 13 Natco, 16 Spindles.
No. 121 Baker, 1½" Cap. M. D.

GEAR HOBBS

No. ½ Schuchardt & Schutte.
No. 3 Barber Colman, m. d.

GRINDERS

No. 11 B. & S. Plain, S. P. D.
No. 20 Heald rotary surface.
No. 14 Gardner Opposed Disc.
No. 7½ Gardner, 30" Disc, B. B.
No. 2 Gardner disc. 18" disc pr.
No. 2 Brown & S. surface, b. d.
No. 1 Wil. & M. B. B. Hand Surf.
No. 2 Norton cutter & reamer.
No. 1 Cincinnati tool & cutter.
5 H. P., 18" Queen City Disc, b. d., New.
No. 2 Heim Centerless, M. D.

LATHES

½ & ¾" Hardge. Bench, Collets.
9" x 12" Sundstrand Mfg. grd. hd.
14" x 6" Hende, Q. C. G.
14" x 8" Hende, cks. & collets.
16" x 6" C. & J., grd. hd., Timken
Bearing, motor in base, new.
16" x 6" South B., q. c. g.
16" x 24" x 10" S. B. Cap.
18" x 8" Barnes.
18" x 8" B. & E., q. c. g., t. a.
20" x 9" Hamilton, q. c. g.
20" x 13" Cisco Grd. Hd., M. D.
24" x 12" Schum. B. q. c. g.
30" x 16" H. S. & Gamble, q. c. g.

LATHES (TURRET)

No. 2A W. & S. Univ. 3¼" Hole, single pulley drive.
No. 4, W. & S. cone hd., col.

54" BULLARD NEW ERA TYPE
VERTICAL TURRET LATHE
WITH SIDE HEAD, A. C.
M. D. 4 JAW CHUCK TBL.

No. 27x30 U BUFFALO UNI-
VERSAL IRONWORKER,
30" THROAT, CAP. 2½"
RD. 1" PLATES, A. C.
MOTOR DRIVE.

No. 6 GALLMEYER & LIVING-
STON HYDRAULIC SUR-
FACE GRINDER, 12" x 48"
CAP., A. C. MOTOR DRIVE.

72"x54"x24" POND DOUBLE
HOUSING PLANNER. 2 HDS.
ON RAIL. TWO SIDE HDS.
BELTED MOTOR DRIVE.

No. 27-K BLISS, 1000 TON
KNUCKLE JOINT EMBOS-
SING & COINING PRESS.
2½" STROKE. ARR. M. D.
LESS MOTOR.

No. 4, Warner & Swasey 6 spd.
Geared Head, M. I. B.
No. 5 Foster All Grd. Hd. S. P. D.

MILLING MACHINES

No. 4 Hende Norton Pl. S. P. D.
No. 2 Kempa, Pl. & Univ. B. G.
No. 2 Kempa, Universal, B. G.
No. 2 Ohio Heavy Univ. S. P. D.
No. 4B Becker, vert., b. b., spd.
No. 2½ Rockford universal.
No. 3 Rock d Rigidmill, M. D.
No. 6 Whitney hand, motor dr.
No. 2Y, B. & S. Pl., mtr. drive.
No. 2, Van Norman Sub Head.
No. 1 B. & S. Plain, cone head.
No. 1 Kent Owens B. B. Hand.
4½" x 12" Pratt & W. Thread.

PRESSES

No. 6-C Bliss Dbl. Crk., Grd. M. D.
No. 5 Bliss-Con. o. b. i.; Grd.
No. 4 Rock & Walsh, o. b. i., Grd.
No. 1 Bliss Cam, Fly & Grd.
No. 6 Fox "Superflex"
Nos. 2 Bliss-Con. obi. B. D.
No. 62 Bliss S. S.
No. 2R & 3R Rockford, obi new.
Model "B" Rockford obi new.
20 Ton Stecher Screw.
30 Ton Lucas Forcing, M. D.

SCREW MACHINES

No. 00G B. & S. Auto. M. D.
No. 0 B & S Hand m. d.

SHAPERS

24" Stock & Milw. b. g. crank.
20" Hende B. G. Crk. S. i. d.
20" G. & E. & Milw. b. g. crk.
16" & 20" Steptoe b. g. crank.
16" G. & E. b. g. crank.
16" G. & E. Gear Box, M. D.

MISCELLANEOUS

Bolt Cut., 2½" Landis Lead Scr.
Bor. Mill, No. 3A Univ. Hor.
Broach, No. 2 LaPointe S. P. D.
Broach, No. 3 Oilgear.
Comp. 7x6 Worth Dup., M. D.
Die Filer, No. 5 Rearwin, m. d.,
New.
Die Filer, No. 5 Thiel, m. d.
Keyseater, No. 2 Davis, ½" cap.
Marking Mch. No. 12 Martin.
Nibbler, No. 2 Campbell, M. D.
Oil Sep. 1 Bu. Curtis, M. D.
Planer, 30x30x10" Am. Box Tbl.
Planer, 30"x24"x8" Gray.
Punch & Shr., No. 55 H. & W.
Riv. Ham. No. 2 Grant, ¼" Cap.
Riv. Hmrs. Nos. 1AA, 2A, 3A,
3A H. D., & 5A High Speed.
Riv. Spin ¾" Linley, M. D.
Riv. Htr. ¼" Berwick Elec. 440 v.
Saw, No. 2 Klemm Metal Band,
M. D.
Saw, 6x6" Peer, univ. shpg. m. d.
Scleroscopes, D' Shore.
Shr., 6"x14 gs. D. & K., sq. m. d.
Shear, 10" x 14 gs. D. & K.
Squeeze, Motor Drive.
Shear, No. 138 Marshalltown
Rotary, Serpentine, M. D.
Slotter, 3¼" Garvin Die.
Slotter, 10" Sellers.
Slotter, 3¼" Rhodes Vertical.
Tapper, No. 1 Garvin, m. d.
Tester, No. 3H Rock. Hardness.
Threading Mch. ¾" Geo. M. D.
Welder, 10kva Amer. Elec. Fus.
Welder, 12½" K. W. Fed. Spot.
Welder, No. 20A Thomp. Butt

George M. Bernstein & Co.

12 50. CLINTON STREET

CHICAGO, ILLINOIS

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Porter-Cable Machine Co.	178	Vimco Mfg. Co.	92
Postel Filing Mch. Co.	122	Vine, R. A.	201
Pratt & Whitney	18-19	Vonnegut Moulder Corporation	137
Printz Electric Co.	121	Wade Instrument Co.	117
Procurator Safety Chuck Co.	27	Wade Tool Co.	130
Progressive Tool & Cutter Co.	120	Walker-Turner Mfg. Co.	153
Putnam Tool Co.	211	Walls Sales Corporation	126
Pyrometer Instrument Co.	114	Walton Co.	124
Quality Tool Works	140	Wardwell Mfg. Co.	139
Quality Tool & Die Co.	144	Warner Elevator Mfg. Co.	178
R & L Tools	30	Western Tool & Mfg. Co.	163
Racine Tool & Mch. Co.	111	Western Tool Exchange	204
Reeve-Fritts Co.	178	Westlof Tool & Die Co.	110
Regar Mch. & Mill Supply, S. M.	177	West Penn Machinery Co.	181
Reisinger Mfg. Co.	148	White Machinery Co., A. D.	182
Reliance Machinery Sales Co.	177	White, Daniel M.	200
Remco Products Corp.	158	Whitney Metal Tool Co.	15
Renu Tool Company	112	Wigglesworth Machinery Co.	180
Rigid Tool Holder Co.	128	Wilson, K. R.	20
Riverside Machinery Depot	184	Wittek Manufacturing Co.	95
Rivett Lathe & Grinder, Inc.	5	Wodack Electric Tool Co.	153
Robbins Engineering Co.	Front Cover	Wolnick Machinery Co., H. F.	178
Rockford Drilling Mch. Co.	149	Wyzenbeek & Staff, Inc.	54-55
Rockford Iron Works	89	Yoke Supply Co., Wm. S.	155
Rosenkranz, Weisbecker & Co.	181	Zeeve, Alex.	175

Here's Proof That Putnam End Mills Last 64% to 443% Longer



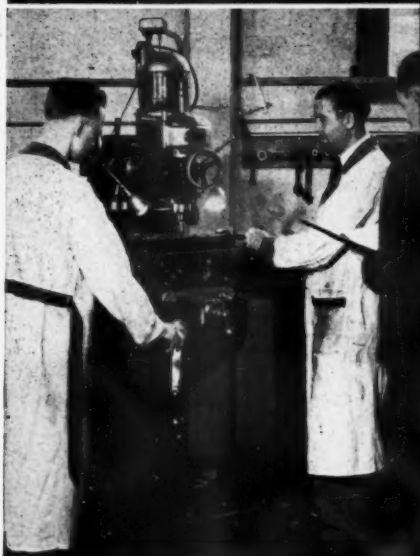
THE TEST—End mills of five well-known standard makes were tested for breakdown in milling slots $\frac{3}{8}$ " deep in a bar of d steel. Each was a two-fluted cutter of $\frac{1}{4}$ " diameter. The speed—2100 r.p.m.'s or 1' feet per minute. The testing machine—Bridgeport Turret Milling Machine.

THE RESULTS—In the tests, the end mills were identified by numbers only, the company markings having been entirely removed. The actual recorded figures showed End Mill No. 3 to be far superior in long-lived cutting performance. Up to the final disintegration of the flutes, End Mill No. 3

- stood up 64% longer than End Mill No. 2
- stood up 112% longer than End Mill No. 5
- stood up 350% longer than End Mill No. 1
- stood up 443% longer than End Mill No. 4

After the tests were completed, END MILL No. 3 WAS REVEALED AS A STANDARD PUTNAM HI-SPEED END MILL.

IMPORTANT NOTE—These tests were conducted by an organization in no way associated with the Putnam Tool Company. Photostatic copies of the actual report can be supplied upon request.



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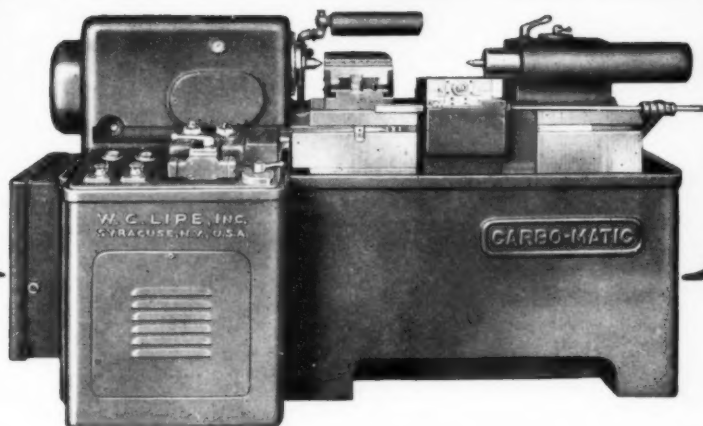
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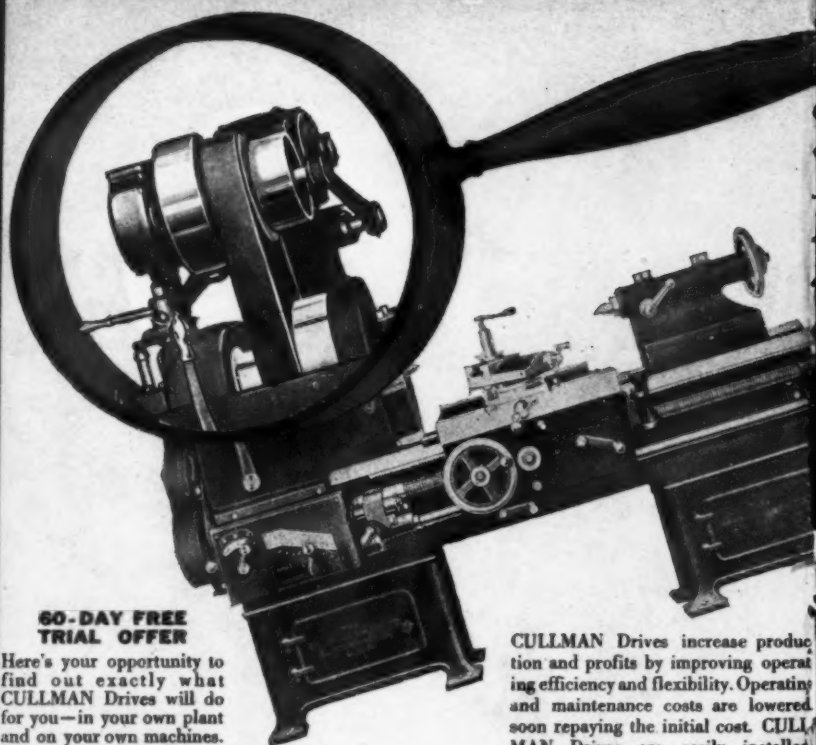
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